The Place of Science in Nineteenth-Century American Catholic Higher Education

by

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Abstract

By 1900 Catholic educators had opened over two hundred institutions of higher learning across the American landscape, most of which provided at least some measure of instruction in science. No fewer than a dozen built astronomical observatories, five trained physicians, and others made strong attempts to provide an education in engineering and other scientific fields. Despite these gains, the standard literature about history of science and medicine in nineteenth-century America offers very little regarding the distinct shape and contributions of this Catholic higher educational enterprise when it came to the teaching of science. Furthermore, how these institutions came to be well-established amidst so many non-Catholic colleges and universities stands out as an important question within the larger history of American higher education.

This dissertation takes as its principal goal to explore the place of science in nineteenth-century American Catholic higher education. Its five core chapters investigate the teaching of science for male and female students at a mix of institutional settings and geographical locales where religion and science co-produced a broad range of outcomes. The details that I present will beneficially compel a revision of views that regard American Catholics and their schools as inattentive to or unconcerned with science.

By taking a detailed and overdue look at the teaching of science by Catholics, I provide a valuable corrective to our understanding of American Catholic higher education, one that not only reveals Catholics attentive to science, but at times that they and their schools were quite good at teaching it during the nineteenth century. No longer should narratives about Catholics showing them as having little interest in the teaching of science be uncritically accepted.

Acknowledgements

After 22 years of climbing a graduate education ladder at the University of Wisconsin, I have at last reached its upper rung. It gives me great pleasure to acknowledge those individuals and institutions who have steadied this ladder and helped to make this dissertation possible.

Ron Numbers has been with this project from start to finish and any credit for its success must be shared with him. His patient guidance, terrific insights, forceful editorial feedback, and honest comments made it possible for me to realize the dissertation you now hold in your hands. As an advisor, mentor, and a friend, I could not have asked for anyone better. Thank you, Ron.

Sue Lederer generously became a member of my dissertation committee when Ron retired from the university in 2013 with the understanding that "Ron does the heavy lifting." That said, Sue performed plenty of heavy lifting of her own with great comments, questions, and notes on the dissertation's final draft and helping me navigate the rocky shoals of university policies and rules when it came to my remaining a doctoral candidate in good standing way past the normal deadlines.

John Rudolph came onboard as an original member of my committee and provided great feedback on chapter drafts over the years, usually over coffee where our conversations expanded into general discussions about the history of science education as well as the historian profession itself. I appreciated his perceptive questions and notes regarding my assumptions, who would be my audience, and that my analysis advanced significant points and not just more historical details.

Adam Nelson and William Reese filled out my committee's amazing membership when they joined the year before I was scheduled to defend. Given that they had limited prior contact with my project, I am more than grateful for their willingness in taking on the imposing task of reading an entire dissertation for the first time scarcely a month before my defense. Their fresh take on the completed project yielded invaluable comments and suggestions that helped to better reinforce my main arguments across chapters.

For 22 years the *History of Cartography Project* became the best second home a graduate student could ever want. Being hired in January 2000 as the Project's Illustrations Editor proved beneficial to all concerned as working with David Woodward, Jude Leimer, Beth Freundlich, and many others blended the history of maps and mapmaking with homemade enchiladas and sending postcards 'home' from over a dozen countries that I visited during my decades with the Project.

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Many thanks to the helpful archivists and librarians at the dozens of collections visited over the course of this dissertation for without your assistance and historical materials the end result would have been less impactful. I am sorry that I cannot identify everyone who brought out boxes, folders, books, opened dusty cabinets, and made photocopies for me. If in return, I have drawn attention to overlooked items at your institutions related to the teaching of science, then my visits turned out well for everyone concerned. Along with Hathi Trust Digital Library, the Internet Archive, Google Books, and other digital resources, I am indebted to the libraries and archives which digitized and put online so much material that gave substantial richness to my discussions.

Of all the archives I visited, the one at Santa Clara University deserves special mention. Archivist Anne McMahon and I shared matching interests in some old scientific instruments in her archives and on exhibit in the campus museum and we wanted to learn more about their past during the years when Santa Clara called itself "a favorite abode of science." As it turned out, my research developed into a larger and more critical historical question asking about the place of science at Santa Clara and other American Catholic colleges and universities during the same period, a question that became the primary focus and eventual title of this dissertation.

Let me collectively thank the many graduate student fellow travelers who shared my path over the years since January 2000 when I entered the history of science program. I enjoyed your help, listening, feedback, partaking of meals and beverages, and friendships. Special recognition goes to Jennifer Martin, longtime coworker with the History of Cartography Project, and Melissa Charenko, fellow *Sciuridae* aficionado, for furnishing crucial encouragement and special wisdom that helped me get to the dissertation finish line.

I am grateful to David C. Lindberg for the gift of his copy of the *Catholic Encyclopedia*. While available online and on DVD, it was much more profound to use the hardcopy edition of this multi-volume work in preparing my dissertation. Moreover, it serves as a regular reminder of Dave's past support of my academic pursuits.

I wish to acknowledge the following sources of dissertation research and presentation funding support: the Cushwa Center at the University of Notre Dame; the Charles Redd Center at Brigham Young University; the Scientific Instrument Society; the University of Wisconsin Graduate School; and the University of Wisconsin History of Science Department.

To close, this dissertation is dedicated to my parents who always encouraged me to try to do better in school. Having previously earned B.S., M.S., M.Sc., M.A., and M.E. degrees, this Ph.D. again evokes that encouragement and so honors their memory.

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Abbreviations

Archive abbreviations used in footnotes:

ASUSA – Associated Sulpicians of the U.S. archives (@STMSUA), Baltimore, MD

BYUA – Brigham Young University archives, Provo, UT

CUAA – Catholic University of America archives, Washington, D.C.

FILSON – Filson Historical Society, Louisville, KY

GTUA – Georgetown University archives, Georgetown, D.C.

LMUA – Loyola Marymount University archives, Los Angeles, CA

MJA – Midwest Jesuit Archives, St. Louis, MO

NARA – National Archives and Records Administration, Washington, D.C.

NDMA – Notre Dame of Maryland University archives, Baltimore, MD

NDUA – Notre Dame University archives, South Bend, IN

SCUA – Santa Clara University archives, Santa Clara, CA

SHCUA – Spring Hill College university archives, Mobile, AL

SLUA – St. Louis University archives, St. Louis, MO

StEA – St. Edward's University archives, Austin, TX

StMA – St. Martin's College archives, Lacey, WA

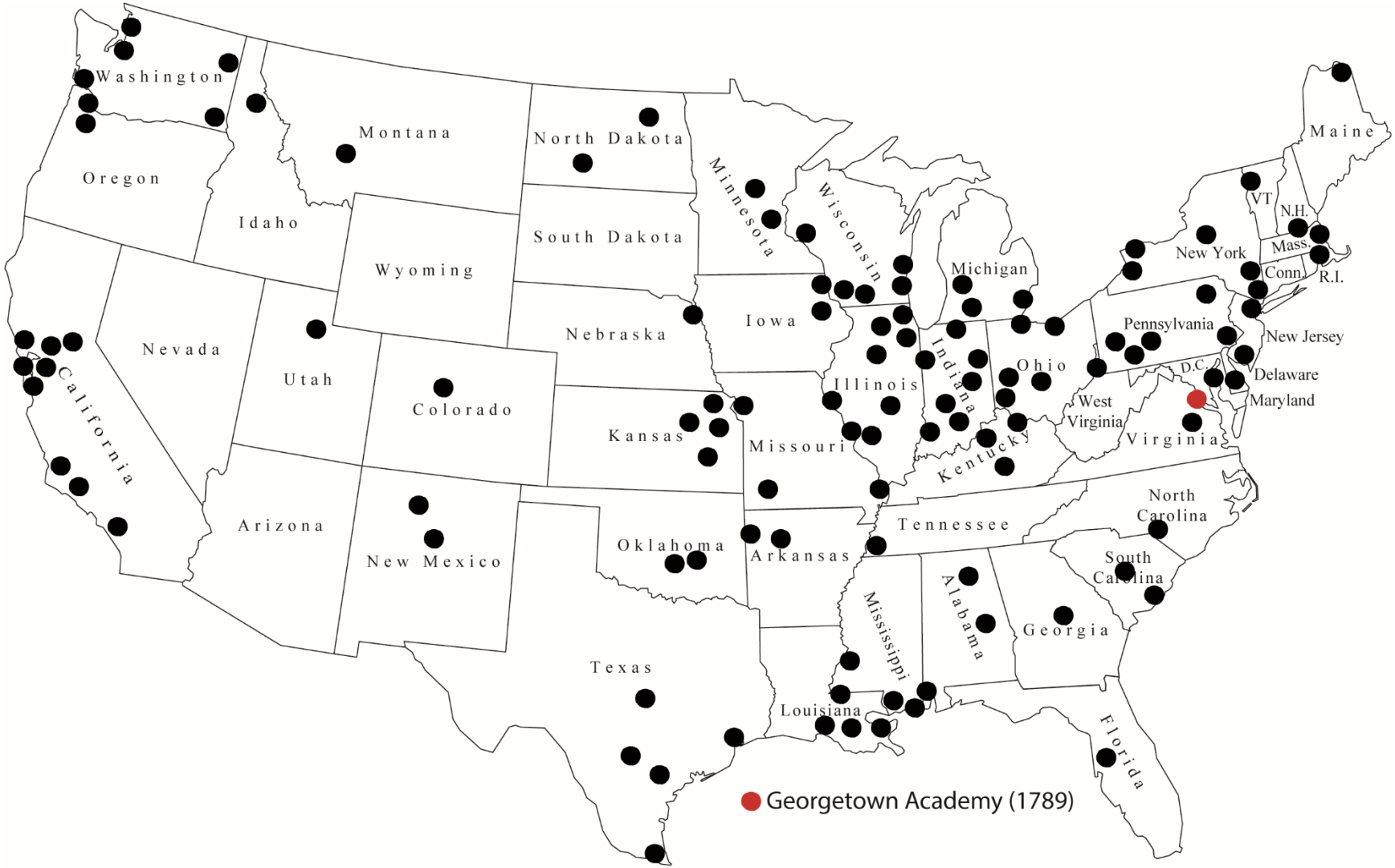
STMSUA – St. Mary's Seminary and University archives, Baltimore, MD

UCAC – Ursuline College archives, Cleveland, OH

USFA – University of San Francisco archives, San Francisco, CA

UMCPSP – University of Maryland College Park special collections, Baltimore, MD

Map 1 - Catholic Educational Institutions founded over the years 1789 to 1900



Introduction

The rise of American Catholic higher education in the nineteenth century owes much to the teaching of science for its pattern of development and expansion. That Catholic educational institutions could operate as productive vehicles to pass along and protect Catholic values to a small yet increasing Catholic populace was not lost on church leadership during this period and in that work the teaching of science would render a practical impact. Although not an element of Catholic doctrine, science nonetheless enjoyed a lively traditional engagement with Catholic education that accounts for this synergetic connection. By 1900 Catholic educators had opened over two hundred institutions of higher learning across the American landscape, most of which provided at least some level of instruction in science (see Map 1). No fewer than a dozen built astronomical observatories, five trained physicians, and others made strong attempts to provide an education in engineering and other scientific fields. Even if Catholic institutions were not in the vanguard of American higher education during the nineteenth century, how they came to be well-established in the midst of so many other non-Catholic colleges and universities by its end stands out as an important question in the larger history of American education. I argue that the notable gains achieved by Catholic institutions were earned, in part, from conferring an explicit place to the teaching of science in their schools.[1]

Yet, despite the gains attained by Catholic higher education, the standard literature about the history of science and medicine in nineteenth-century America says little about the distinct shape and contributions of their higher educational enterprise when it came to science. Except

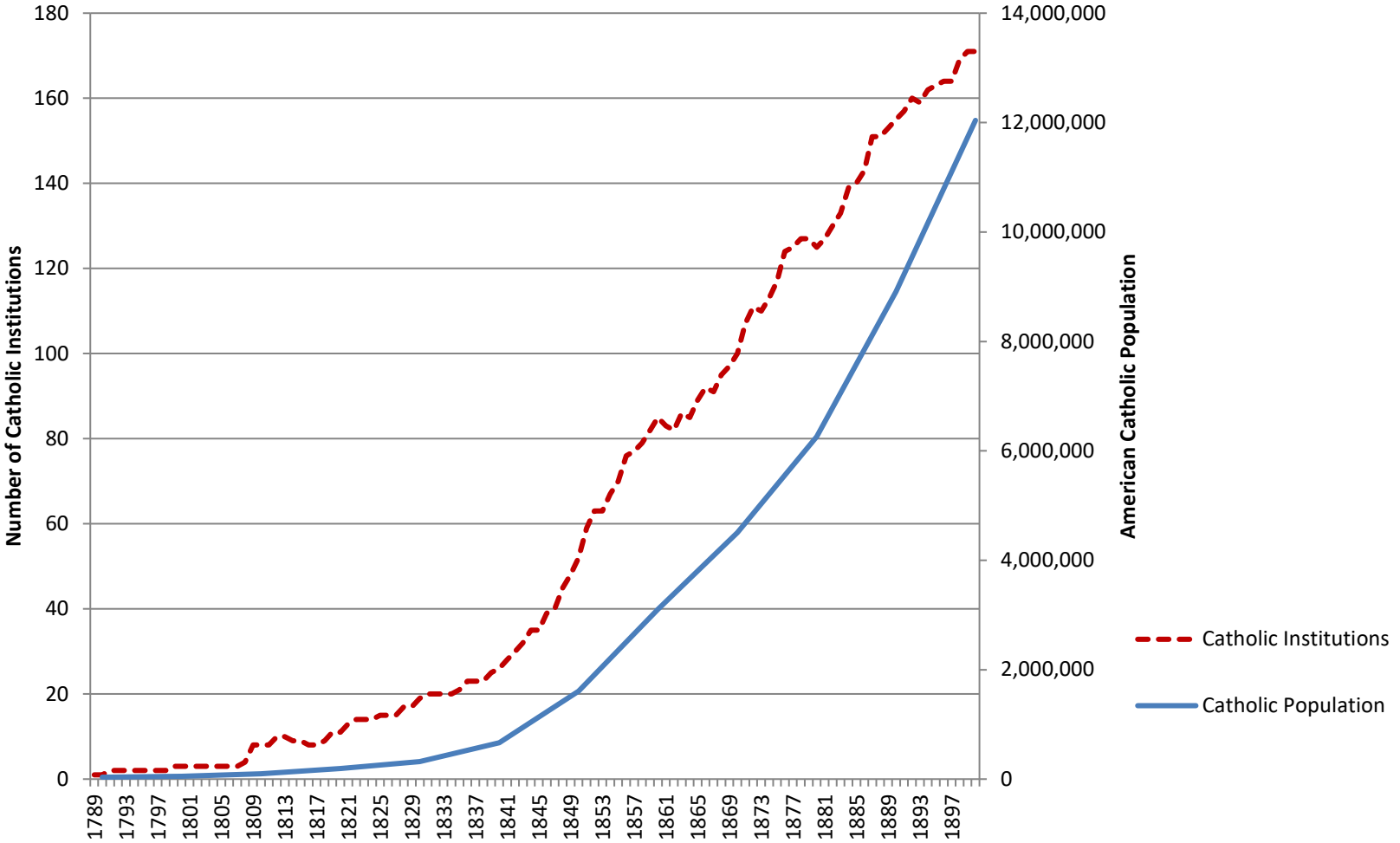
[1] This number of institutions comes out from my own Filemaker database of nineteenth-century Catholic academies, colleges, and universities gleaned from a multitude of sources. See Appendix 2 for a list of institutions opened from 1789 to 1900 along with their main details.

for a few little-known institutional histories and biographies, Catholic histories have been equally silent about science. Given this dearth of general coverage, an investigation into the place of science in nineteenth-century Catholic higher education seems particularly relevant given that Catholics grew from being one of the smallest American religious groups to the largest during this period (see Graph 1).[2]

The few historians of science who discuss nineteenth-century Catholics and their colleges mostly portray their defensive stance, as when Daniel Kevles depicted clerics being "determined to protect the faithful" in positioning these institutions as "a fortress for the militant defense of the faith." Robert Bruce describes the difficulties in locating scientifically active Catholic Americans when he remarked that individuals with "Catholic . . . backgrounds seem to have been rare." In his study of the ante-bellum American college, Stanley Guralnick pointed to no Catholics and provided only a passing remark regarding the observatory at Georgetown College. Catholics fared no better in John Lankford's exploration of American astronomy, or in Paul Starr's description of American medicine, although Starr did speak about Catholic hospitals. Regarding science and instruction for Catholic women, Tracy Schrier and Cynthia Russett wrote that recent scholarship "has largely ignored Catholic women's colleges." Kim Tolley allotted only a few sentences about education for Catholic girls that weakly remarked about "*indications* of the movement to bring science into girls' courses of study . . . in some Catholic schools" and offered a lone example of an 1842 Catholic academy claiming to advertise a bona fide science

[2] Claim for the size of Catholics as a group in the United States made in Edwin Scott Gaustad, et al., *New Historical Atlas of Religion in America* (Oxford: Oxford University Press, 2001), 157.

Graph 1 - Number of Catholic Institutions and American Catholic Population 1789 to 1900[3]



[3] Number of Catholic institutions calculated using the opening/closing dates in 236 records in my Filemaker database of academies, colleges, and universities. Catholic population from Table LXIII in Gerald Shaughnessy, *Has the Immigrant Kept the Faith? A study of immigration and Catholic growth in the United States, 1790-1920* (New York: The MacMillan Company, 1925), 262.

curriculum. Without a doubt, as Catholic historian Philip Gleason has observed, "the full story of Catholic colleges in the nineteenth century is yet to be told."[4]

Yet, with focused effort, American Catholics in science can be located. As one example, Ronald Numbers identified three Catholic naturalists active in the years 1863-1900 who became members of the National Academy of Sciences. Based on her study of leadership members in the American Association for the Advancement of Science, Sally Gregory Kohlstedt located a modest subset of Catholics – just 16 out of 253 – among members known to be religious or belonging to a church. While encouraging, these small numbers prompted some scholars who did mention Catholic science to still downplay their significance. Robert Kohler pointed to the small impact of Catholic higher education when he noted that Catholic institutions produced almost no Ph.D.s around the turn of the twentieth century. From their report on the origins of American scientists from 1881 to 1940, Knapp and Goodrich, a psychologist and biologist respectively, pointed out how Catholic colleges and universities "lie among the least productive 10 per cent of all institutions and constitute a singularly unproductive sample." Last, according to sociology professor and Catholic priest Andrew Greeley, American Catholic higher education at the close of the nineteenth century, science included, stood in a "backwater" far outside the main tides of American higher education. These critical appraisals along with the few words and

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[4] Daniel J. Kevles, *The Physicists: The History of a Scientific Community in Modern America* (Cambridge, Massachusetts: Harvard University Press, 1995), 208. Robert V. Bruce, *The Launching of Modern American Science 1846-1876* (Ithaca: Cornell University Press, 1988), 119. Stanley M. Guralnick, *Science and The Ante-bellum American College* (Philadelphia: American Philosophical Society, 1975), 89. John Lankford, *American Astronomy: Community, Careers, and Power, 1859-1940* (Chicago: University of Chicago Press, 1997). Paul Starr, *The Social Transformation of American Medicine: The Rise of a Sovereign Profession and the Making of a Vast Industry* (New York: Basic Books, 1982), 173-5. Tracy Schier, et al., *Catholic Women's Colleges in America* (Baltimore: The Johns Hopkins University Press, 2002), 1. Kim Tolley, *The Science Education of American Girls: A Historical Perspective* (New York: RoutledgeFalmer, 2003), 40 (italics mine). Philip Gleason, *Contending with Modernity: Catholic Higher Education in the Twentieth Century* (New York: Oxford University Press, 1995), 5. Gleason also admits "there is no satisfactory survey" for this early time period in his *Bibliographic Essay on the History of Catholic Higher Education* in Thomas C. Hunt, et al. (eds.), *Handbook of Research on Catholic Higher Education* (Greenwich: Information Age Publishing, 2003), 95-113.

pages available from other sources intimate that American Catholic colleges and universities afforded science little priority during the nineteenth century. I will demonstrate otherwise.[5]

My Approach

My dissertation improves on this situation of sparse and often rueful histories through a comprehensive exploration of American Catholic higher education over the nineteenth century. Visits to over sixty archives and libraries nationwide (see Appendix 1 for the list) provided historical evidence covering a full geographical range of science teaching at male and female Catholic institution of higher learning along with referring to a wide array of primary and secondary sources. There I found repeated instances of curricular malleability in the face of varied local economic, social, political, and religious conditions that Catholic colleges and universities evinced, thus the need to examine institutions from locations across the country to be thoroughgoing in my appraisal regarding the attention and actions they directed toward the teaching of science.[6]

Understanding this geography became necessary for my research in three ways. First, although Map 1 shows the United States well covered with over 200 Catholic institutions circa

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[5] Ronald L. Numbers, *Darwinism Comes to America* (Cambridge, Mass.: Harvard University Press, 1998), 145-7. Sally Gregory Kohlstedt, *The Formation of the American Scientific Community: the American Association for the Advancement of Science, 1848-60* (Urbana: University of Illinois Press, 1976). Robert E. Kohler, "The Ph.D. Machine: Building on the Collegiate Base," *Isis* 81 (1990), 638-662. Robert Hampden Knapp, et al., *Origins of American Scientists: A Study Made under the Direction of a Committee of the Faculty of Wesleyan University* (New York: Russell & Russell, 1967), 24. Andrew M. Greeley, *From Backwater to Mainstream: A Profile of Catholic Higher Education* (New York: McGraw-Hill Book Company, 1969). Science took a one-page backseat in Edward J. Power, *A History of Catholic Higher Education in the United States* (Milwaukee: Bruce Publishing Company, 1958), 57.

[6] While archival materials provided considerable evidence for my research, I cannot overstate the value of the many historic Catholic publications, especially institutional catalogs, that offered equally essential details about Catholics and their schools. In fact, it could be argued that those publications helped spread Catholic higher education, if not Catholicism itself, across the US during the nineteenth century. References about their histories include: on Catholic almanacs, see Joseph H. Meier, "The Official Catholic Directory," *The Catholic Historical Review* 1:3 (1915), 299-304; regarding Catholic newspapers, see Paul J. Foik, *Pioneer Catholic Journalism* (New York: Greenwood Press, 1969) reprint of 1930 original book; and about a all-purpose multi-volume source helpful to my learning more about Catholics, *The Catholic Encyclopedia*, see *The Catholic Encyclopeida and its makers* (New York: The Encyclopedia Press, 1917).

1900, this growth began in 1789 starting with just one school, Georgetown Academy (see Map 2), which became the source from which future institutions developed. Thus, their one-by-one increase, contingent with successes and failures, pointed to *location* as being an essential, often providential, aspect of institutional survival. Second, I regularly compared a Catholic institution in a given location to a nearby non-Catholic institution to elucidate the kind and level of science being taught and to what depth. For example, contrasting Santa Clara College in California with far off Harvard University would be of little value but comparing Santa Clara to nearby College of California yielded many insights as to the place of science for both schools. Third, I explored several instances of institutional replication where an established religious order launched a new school modeled on one of their existing schools. Asking to what extent science teaching moved to a new location from its prototype became a further way to learn how science found a place in the expanding American Catholic educational enterprise. Consequently, through my attention to geography I overturn the idealist notion of Catholics conducting a monolithic system of schools supposedly disinterested in teaching science and instead detail how science in many cases did find a place in the Catholic classroom owing to local conditions and needs.[7]

No single question animated my research about the place of science in nineteenth-century American Catholic higher education. Initial focus always fell to looking for the science subjects being taught with good evidence coming from newspaper advertisements, directories in Catholic almanacs, and the annual catalogues published by many institutions. Natural philosophy, botany,

[7] While David N. Livingstone emphasizes place in the shaping of science, Christine A. Ogren considers location or "sites" one of four important categories when it comes to understanding higher education in the United States. See David N. Livingstone, *Putting Science in its Place: Geographies of Scientific Knowledge* (Chicago: The University of Chicago Press, 2003) and Christine A. Ogren, "Sites, Students, Scholarship, and Structures: The Historiographies of American Higher Education in the Post-Revisionist Era," in William J. Reese, et al. (eds.), *Rethinking the History of American Education* (New York: Palgrave Macmillan, 2012). I compare Santa Clara College and the College of California in chapter 3. Catholic historian Andrew Greeley likewise recants this "monolith myth" in Greeley, *From Backwater to Mainstream: A Profile of Catholic Higher Education*, pg. 1.

mathematics, chemistry, astronomy, geology, etc., would appear alongside subjects like rhetoric, grammar, spelling, and other basic subjects taught in early American higher education, Catholic or otherwise. Next, I sought details about who taught these science subjects, were they religious or lay instructors and what education or background did they have to teach science. At the same time, asking who enrolled in these many academies, colleges, and universities and what they did with their education after graduating (or otherwise leaving) highlights the critical strategy on my part to elevate student outcomes if and when it came to science. It is through these students, the operational aim of Catholic education, that I best show the place of science in their schools.

Beyond asking who taught, what was taught, and who was taught, other questions guided me in working to understand Catholic higher education. Were Catholic schools equally attentive to teaching science to both men and women? Did Catholicism encourage or dissuade interest in certain science subjects? Was there anything distinctive regarding Catholic institutions vis-à-vis the teaching of science compared to non-Catholic schools? Last, what were some of the primary reasons why American Catholic institutions taught science? These general questions cast a wide net that I fill with details about the numerous institutions discussed in the following five chapters to map out the shape and contributions of Catholic higher education when it came to science. As I dispel the view that nineteenth-century American Catholic higher education had little interest in teaching science, I will also confirm some of the previous poor appraisals of Catholic colleges and universities as many of them were far from perfect and unproductive.

Chapter Overview

A century of locations, institutions, people, and religion coalesce in my five core chapters to yield up the place of science in American Catholic higher education with each chapter fronted by an epigraph to set its focal theme. The first two chapters go into far-reaching detail related to

the teaching of science and how science played a part in helping early Catholic schools survive and improve respectively. My next pair of chapters consider how Catholic institutions responded to the challenges and then determined productive ways to teach science while remaining reconciled with their religious commitments. The closing chapter serves as a report on the outcome of these determined efforts. Together, they encompass a myriad of Catholic institutions that collectively cut across the numerous Catholic religious orders establishing schools in rural and urban areas for both male and female students. The result is a sustained narration of science in a growing system of schools that furnishes the historical attention I found lacking in prior studies.

My opening chapter details the beginning of Catholic higher education from one academy in 1789 to a handful of subsequent institutions by the early 1840s. It proceeds chronologically to explain not only the initial growth of Catholic schools, but also to show it taking place in settings where Catholics felt safe in the emerging American nation, predominantly the states of Maryland and Kentucky along with territories further west and south. Here I argue that success more likely came to those schools that cultivated a conspicuous place for science in their offered curricula to best serve the real-world educational needs of these far-flung Catholics and often their equally underserved non-Catholic neighbors.

Building on the foothold secured by these Catholic institutions discussed in chapter 1, my next chapter argues how they and most of the over one hundred institutions that followed in their steps endeavored to advance their instruction in science during a decades-long period of constant improvement. I confirm not only that Catholics schools remained attentive to science during the nineteenth century but how they were willing to challenge traditional Catholic educational norms to do so by conferring Bachelor of Science and specialized engineering degrees, opening medical

schools, and providing an education in the business arts. Through these and other improvements Catholic colleges and universities gained in reputation to become better and, sometimes, the best places to study science.

In contrast to my opening chapters that looked at how Catholics first established and then improved their schools, my third chapter steps back to survey how these institutions responded to problems, criticisms, and competition with other schools during the second half of the nineteenth century. Their responses, and sometimes non-responses, viewed with an eye toward the teaching of science, offer original insights about the priority and purposes granted to science in support of Catholic higher education. Although largely responsive to the changing needs of their students, I describe how the genuine aspirations of these colleges and universities to teach science often led to mixed results, efforts made more challenging given the shifting landscape of American higher education at the time.

The relationship between science and religion comes to the fore in my fourth chapter as it related to the teaching of science at American Catholic colleges and universities. I point out how these two realms sometimes worked in harmony to reinforce the teaching of some sciences (such as astronomy) while at other times stifling the opportunity to offer science instruction (as through their commercial course curricula). When joined science and religion extended the scope and purpose of American Catholic higher education. Yet sometimes Catholicism worked to make their institutions cautious concerning the depth to which they taught a contentious topic like evolution.

My closing chapter gauges what a century's worth of effort by American Catholic higher education accomplished in teaching science. Based on details gleaned from J. McKeen Cattell's 1910 edition of *American Men of Science*, I located seventy *Cattell's Catholics*, individuals who,

based on their educational affiliations, institutional home, ecclesiastical status, or other directory details, can be classified as most likely being Catholic above and beyond being notable scientists. While my analysis yielded a few positive surprises as to fruitful scientific fields for Catholics, it also confirmed some of the persistent negative impressions about Catholics in science and their institutions of higher education.

Together my chapters titled *Surviving*, *Improving*, *Responding*, *Reconciling*, and *Finding* will show how science in nineteenth-century American Catholic higher education developed over a broad array of institutional and geographical settings where religion and science co-produced a variety of outcomes. At a minimum, the details I discuss will compel a revision of views that see Catholics and their higher education enterprise as unconcerned with or inattentive to science. As my findings, let alone the nature of my research project itself, include many new and novel facets about Catholic higher education as it concerned the teaching of science, revamping these chapters for subsequent publication as a monograph would be an anticipated next step.

Additional Comments

Several comments become necessary at this point. First, my title's wording includes two terms, science and higher education, which I clarify below. The meaning of these terms changed considerably over the nineteenth century, so my descriptions hew to the essentials to be workable across this long period. Next, I present a few words about my religious background pertaining to this deep dive into Catholic educational history. Last, I talk about one research path not pursued while exploring American Catholic higher education.

My research inscribed two main meanings to the word 'science' while exploring its place in Catholic higher education. First, I regarded science as denoting knowledge and learning in the Latin *sciencia* sense with it being something imparted to students. The Rev. John Carroll voiced

this exact view in his 1787 proposal for Georgetown Academy as a place where "communicating science" stood out as a primary objective. Another example appeared in the 1850 prospectus for Spring Hill College in Alabama that spoke of teaching "useful and agreeable knowledge" as part of "a complete education" for students. Second, science functioned as shorthand to take in those subjects related to the natural world that Catholic schools taught along with associated fields such as mathematics and engineering. Each school listed these subjects differently, usually in a way that best advertised their presence in its curriculum while at the same time indicating that they served a vital purpose in a "systematic course of study." My project, then, is to demonstrate science being communicated to students by the American Catholic higher education enterprise during the nineteenth century in contrast to previously cited views. In parallel, I highlight the many science subjects involved in that undertaking as further evidence of Catholics teaching science.[8]

Likewise, the term 'higher education' proves problematic when attached to the numerous Catholic institutions under discussion. As Catholics opened academies, colleges, and universities over the course of nineteenth century, their given names, by and large place-based or religious in nature, generally reflected the true level of an institution at the time of its founding. Georgetown Academy, for example, first enrolled students in the 1790s and not until 1815 did it award its first degrees shortly after receiving a federal charter under the name Georgetown University. Clearly, Georgetown in 1815 was not a university in the accepted sense, yet its initial title as an academy does not exclude it from my considerations given that at first it stood as the only Catholic school in the United States and, thus, provides the critical starting point for my analysis, a choice on my

[8] Printed broadside written by John Carroll, dated 1787, GTUA. 1850 Spring Hill College Prospectus, SHCUA. From "System of Instruction" in *Annual Catalogue of Ursuline Academy, 1893-'94* (Cleveland: F. W. Roberts Co., 1894), 8.

part helped by the academy's stated plans to offer instruction in science. At the other end of the spectrum, Catholic University, inaugurated in Washington, D.C., conferred its first doctorates in the 1890s yet at the turn of the century retreated to baccalaureate-level teaching in science owing to fiscal considerations tied to attracting enough students to remain financially viable. Given all their inconsistent designs, purposes, and unattained dreams, in the end the names of the Catholic institutions portrayed in the following chapters need to be taken at face value knowing, in effect, that each one represented in some way an education that was the best on offer and the 'higher' of its day and place.

Suffice to say my religious background is not Catholic, something most archivists at the many Catholic archives visited quickly figured out. That said, I hope my secular approach does not discourage or limit my expected audience of historians of science, education, medicine, and religion as I wish all to enjoy what I have learned.[9]

Exploring American Catholic higher education for Black Catholics represents an avenue of study not taken. While I found reference to one college meant to serve this group, Epiphany Apostolistic College in Walbrook, Maryland, that opened in 1890 and closed in 1894, it offered little in the way of science given its primary mission of seminary preparation. Competition with Protestant-supported schools which supported black education mattered for one Catholic author who in 1890 worried that graduates from those institutions – "school-teachers, lawyers, doctors, preachers" – "all have been trained to positive opposition to Catholicity." How science played a part in nineteenth-century Catholic inclusionary values and any related religious rivalries remain an undertaking for another day. Nonetheless, my research was able to shed light on one African

[9] A call for historians of science to engage with science education appeared in Graeme Gooday, et al., "Does Science Education Need the History of Science?," *Isis* 99:2 (2008), 322-330. I hope my research encourages more historians of religion to see science and science education as relevant avenues of exploration.

American, William M. Gordon, who received a M.D. degree from Creighton University Medical School in 1901, which showed at least this one Catholic institution lacked any concerns over the admission of a Black student to their professional school.[10]

Last Words

Two aspects about science in American Catholic higher education during the nineteenth century warrant a final mention. First, while many of the institutions that opened in this period shared common basic pedagogical strategies, like awarding prizes at commencement exercises for superior classwork by their students in the sciences and other subjects, these schools varied considerably as to what science and how much was taught in their offered curricula. For the so-called Universal Church, there was nothing universal when it came to teaching science over this century-long timeframe as schools tailored their curricula in response to local conditions as much as they obeyed religious traditions, or Rome for that matter. Second, my research has located ample evidence of Catholic schools teaching science that challenges Greeley's view of Catholic higher education as "academically inferior," "traditional in curriculum and pedagogy," and "isolated almost completely from the mainstream of American higher education" over the period under consideration. I counter by showing that many, but not all, Catholic colleges and

[10] One mention of Epiphany Apostolistic College made in the entry on *Saint Joseph's Society for Coloured Missions*, Charles G. Herbermann, et al. (eds.), *The Catholic Encyclopedia* (New York: The Encyclopedia Press, Inc., 1913), 8:521. Catholic concern about the American Negro, notably education support being provided by "our Protestant friends," can be found in Rev. J. R. Slattery, "The Catholic Negro's Complaint," *The Catholic World* 52: 309 (1890), 347-353, pg. 352. About William M. Gordon, see Dana A. Freiburger, "'To Any Degree': Jesuit Medical Schools in the Nineteenth-Century United States," in Kyle B. Roberts, et al. (eds.), *Crossings and Dwellings: Restored Jesuits, Women Religious, American Experience, 1814-2014* (Leiden: Brill, 2017), 220–255, pgs. 247-248. The Creighton Medical School was not shy about Gordon as he was listed as a fourth-year student and appeared in a photograph titled "Histological Laboratory" in the school's 1900-01 catalogue. A good overview of the larger history of Black Catholics found in Cyprian Davis, O.S.B., *The History of Black Catholics in the United States* (New York: Crossroad Publishing, 1990). Additional history and issues regarding education for Black Americans located within chapters 2 and 3 of Jacqueline Jordan Irvine, et al. (eds.), *Growing up African American in Catholic Schools* (New York: Teachers College Press, 1996). Not until 1925 did a Historically Black Catholic college open with Xavier University of Louisiana located in New Orleans; three years later the college awarded its first degrees through its College of Liberal Arts and Sciences.

universities were not inferior, traditional, nor isolated by way of their alertness to a compelling need to teach science starting with Georgetown in 1789 and throughout the nineteenth century. Unlike Greeley Jesuit historian Gerald McKevitt saw that Catholic higher education flourished within the mainstream of American higher education with its inherent variability, only to lapse into a decline towards the end of the nineteenth century in not being able to keep up with their non-Catholic peers. By avoiding an essentialized view of American Catholic higher education that depicts a non-existent educational ideal and instead letting individual Catholic institutional histories speak for themselves, the place of science in the American Catholic higher education enterprise gains a new and necessary clarity.[11]

In 1984 the Rev. Theodore M. Hesburgh, president of Notre Dame University, wrote that "the historical literature on Catholic higher education in this country is sparse at best." It is my want for the chapters that follow to reduce that historical sparseness, particularly when it comes to nineteenth-century Catholic institutions and how they made a place for science.[12]

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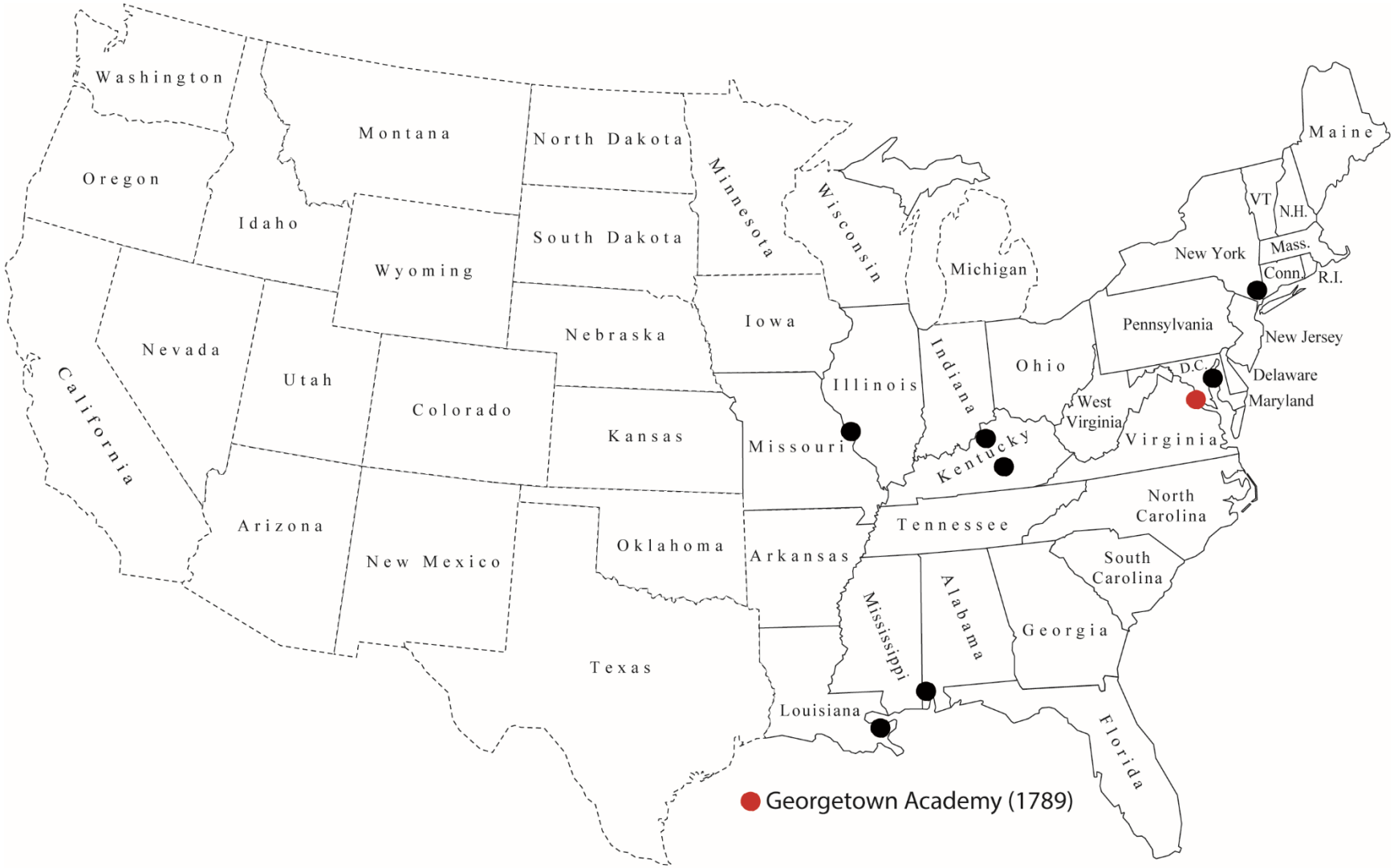
[11] Greeley, *From Backwater to Mainstream: A Profile of Catholic Higher Education*, 13. Gerald McKevitt, S.J., *The University of Santa Clara: A History, 1851-1977* (Stanford: Stanford University Press, 1979), 306.

[12] Paul A. Fitzgerald, S.J., *The Governance of Jesuit Colleges in the United States, 1920-1970* (Notre Dame, Indiana: University of Notre Dame Press, 1984), preface.

Map 2 – Locations of institutions mentioned in *Surviving* chapter



Chapter 1: Surviving

The object of the proposed institution is to unite the means of communicating science with an effectual provision for guarding and improving the morals of youth.

The Rev. John Carroll, Prefect-Apostolic, American Catholic Church, 1787[1]

This chapter appraises American Catholic higher education as it secured a durable foothold in the new nation. Starting in 1789 with the founding of Georgetown Academy, I describe an enthusiastic mission undertaken by American Catholics (and sometimes Protestants) to fashion educational institutions amidst new and still tenuous religious freedoms. For John Carroll, this desire to teach science not only influenced the initial character of these future Catholic institutions, but also how they changed over time. Science and allied subjects quickly appeared in the classroom through those given the task to teach them, such as the Rev. James Wallace, Jesuit professor of mathematics at Georgetown, who in 1812 published a book on the use of globes and astronomy for use by his students. "I am fully persuaded," he wrote later in 1814, "that a taste for science etc. must pervade our colleges, as well as order & piety, to insure their success and reputation." A century after Carroll's proposal for his new academy, the Rt. Rev. Mgr. Thomas J. Conaty, rector of Catholic University of America, spoke "with pride to the results of the last one hundred years" on the success American Catholic higher education as signified by the over 170 Catholic institutions then in operation (see Graph 1), a pride secured in

[1] Quotations taken from the printed broadside written by John Carroll, dated 1787, GTUA.

no small way from what the teaching of science had accomplished for Catholic higher education.[2]

But strong desire and religious zeal did not automatically bestow survival on Catholicism's new schools as a few struggled or failed due to poor management, the lack of resources, or excessive religious fervor at the expense of science. Success came more easily to those institutions which achieved an operational balance between religion and teaching science within a traditional liberal arts context as both curricular elements proved valuable at bringing students into the classroom.

Geography also proved crucial to the fates of these new schools where their location mirrored the spread of Catholicism in the United States, starting with the first schools in Catholic-friendly Maryland where Georgetown led the way followed closely by the establishment of St. Mary's in Baltimore. With the need for schools satisfied in this populated urban region, additional schools appeared next not in the urbanized northern states, except for the short-lived New York Literary Institute, but in the sparsely inhabited states to the west and south, such as Kentucky, Missouri, and Alabama, where many Catholic immigrants began to settle among extant Catholic residents. These new colleges, such as Spring Hill in Mobile, Alabama, eschewed competition with well-established Protestant institutions in the north and improved their odds for success not only by placing attention on teaching science, but in drawing students from families of all religious denominations. Who taught these students proved significant as well, be it a priest or in some settings a lay instructor, as it was pragmatic,

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[2] About Carroll, see "John Carroll" entry in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 3:381-4. James Wallace, *A New Treatise on the Use of the Globes and Practical Astronomy; or a Comprehensive View of the System of the World* (New York: Smith & Forman, 1812). His comment appeared in a letter dated Feb. 26, 1814, GTUA, Maryland Province Archive, Box 58, folder 17. Conaty's statement from his opening address "The Catholic College of the Twentieth Century" at the Third Annual Conference of Catholic Colleges held in Chicago on April 10-12, 1901, from the *Annual Reports of the Department of the Interior for the Fiscal Year Ended June 30,1901: Report of the Commissioner of Education* (Washington: Government Printing Office, 1902), 885-893, pg. 887.

especially in the case of science, to not just advertise a curriculum, but to be able to teach it too. Yet as important as these factors of curriculum, location, and staffing would be in a particular school's eventual success or failure, factors nestled within the church's greater goals of training an indigenous American ministry and attending to the higher education of both men and women in order to develop desirable mental and moral discipline, it was the prominent inspiration generated by the establishing of Georgetown that would propel the American Catholic higher education enterprise forward: *ex uno plures* – from one many.[3]

Georgetown Academy: the model for American Catholic institutions for years to come

Carroll's Georgetown Academy was a product of its times. Nationhood opened the educational door for Catholics long held closed by anti-Catholicism and penal laws that, at least in principle, were overturned by the First Amendment. At the time of Carroll's 1787 broadsheet announcing his new academy, American Catholics began to enjoy improved religious equality as four states, Maryland, Virginia, Delaware, and Pennsylvania, quickly repealed their old penal laws that restricted the civil and religious liberties of Catholics. At this threshold stood John Carroll, sanctioned by Pope Pius VI in 1784 as the Prefect-Apostolic of the Catholic mission in America, a position that allowed Carroll to oversee the work of a small group of Catholic priests in the new nation. "The object nearest to my heart now, and the only one that can give consistency to our religious views in this country," he declared in 1785, "is the establishment of a school, and afterwards of a seminary for young clergymen." Combined with his Jesuit zeal for

[3] Power discusses various motives for the founding of Catholic college, see Power, *A History of Catholic Higher Education in the United States*, 33-46. A similar discussion appears in Donald G. Tewksbury, *The Founding of American Colleges and Universities before the Civil War* (New York: Arno Press, 1969), 55-58. About "survival" in the American Catholic college context, I found an instructive exploration in R. Eric Platt, *Sacrifice and Survival: Identify, Mission, and Jesuit Higher Education in the American South* (Tuscaloosa: University of Alabama Press, 2014), 1-15. Beyond surviving, Morey and Piderit explore "Four Goals of Catholic Colleges or Universities" in chapter 3, *Models of Catholic Universities*, in Melanie M. Morey, et al., *Catholic Higher Education: A Culture in Crisis* (New York: Oxford University Press, 2006). Many thanks to my History of Cartography Project colleague Mary Pedley at the University of Michigan for finetuning this Latin phrase to perfection.

education in a favorable location like Georgetown, the creation of his new school looked alluring and workable. As Philip Gleason discusses, this school would serve as a "foothold" and become "a generalized base for further expansion" in addition to acting as an "all-purpose center of Catholic life." Georgetown became the model that defined American Catholic institutions for decades to come.[4]

After many delays Georgetown at last opened its doors in January 1792 where, in accordance with Carroll's plan of studies, male students needed to meet two requirements – that of being at least eight years old and having the ability to read. A pioneering pair of students entered Georgetown that month and, as word spread of the new institution, its enrollment by the end of the year grew to nearly 70, with four out of five being Catholic. With limited facilities in the face of a student cohort of mixed academic abilities, Georgetown focused first on laying a foundation for their student's educational growth by teaching the rudiments of "reading, writing, arithmetic" as described in Carroll's prospectus. Teaching duties at Georgetown fell to the school's first president, Robert Plunkett, in addition to three paid instructors, with Plunkett and one of the three instructors being former Jesuits. These positions were outlined in Carroll's original plan for the academy as was a basic science-friendly curriculum, features cut from the same cloth as the Jesuit *Ratio Studiorum* which would have been understandable by Plunkett and his staff. Under Carroll's design, higher science would not be taught until their students were ready for its exigencies, preparations entailing a firm footing in ancillary subjects like geometry,

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[4] For an excellent treatment of Georgetown's history, see Robert Emmett Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889* (Washington, D.C.: Georgetown University Press, 1993). A history of anti-Catholic penal laws found in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 11:611-618. Carroll quote from a letter written to Charles Plowden December 15, 1785, in Thomas O'Brien Hanley, S.J. (ed.), *The John Carroll Papers: Volume 1, 1755-1791* (Notre Dame: University of Notre Dame Press, 1976), 196-8. Philip Gleason, "From an Indefinite Homogeneity: Catholic Colleges in Antebellum America," *The Catholic Historical Review* 94 (2008), 45-74, pgs. 61-2. Gleason's "foothold" observation based on his use of "Unpublished Letters of Father Anthony Kohlmann, S.J.," *Historical Records and Studies, United States Catholic Historical Society* 1 (1900), 66-76.

mathematics, and geography along with the mental fitness that the planned years of Latin and Greek would impart. So while science may have been listed conspicuously on the Georgetown prospectus for the first few years, it remained more symbolic than substantive.[5]

Over the next decade, this indirect level of attention to science prevailed at Georgetown as the institution worked to establish itself. Based on textbooks purchased in 1793 from the Philadelphia publisher Matthew Carey, students engaged with conceptual and practical matters as found in titles like Simson's *Euclid*, Gough's *Arithmetic*, Gibson's *Surveying*, and Moore's *Navigation*. Widely used standard works of the times, these texts confirm Georgetown's ability to educate students under its tutelage, if not directly in science, at least beyond the customary literary arts. Moreover, Georgetown was public about its esteem for the qua sciences when, at the July 1798 public examination of students, rewards for excellence in geography and bookkeeping as well as each of the four class levels of Latin were conferred. Hence, not only for its students, but to parents and community also, this public examination demonstrated that Georgetown had made appreciable progress towards its commitment of "communicating science" to its students.[6]

Credit, in part, for this pleasing outcome must go to Carroll who, per his earlier designs, detailed that there be a teacher for "the elements and useful branches of mathematics" and, "if it is found compatible and convenient, the lessons of geography." While this policy fit with the

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[5] Government of Georgetown College, 1791, from Hanley (ed.), *The John Carroll Papers: Volume 1, 1755-1791*, 482-7. See Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 35 and 397; this latter page tabulates the number and backgrounds of students. Regarding these new students, a short newspaper article confirms this situation where "taking into consideration the newness of the institution, the different periods at which the youths have been instructed," they were "able to give a good account of what they had been taught." "Georgetown," *The Diary; or Loudon's Register*, August 18, 1792, 3. About Plunkett and his staff, see John Gilmary Shea, *Memorial of the First Centenary of Georgetown College, D.C., comprising a History of Georgetown University* (New York: P.F. Collier, 1891), 15.

[6] This list of books appears in John M. Daley, S.J., *Georgetown University: Origin and Early Years* (Washington, D.C.: Georgetown University Press, 1957), 83. Chapters on mercantile arithmetic in Gough's book would have allowed Georgetown to teach bookkeeping. Georgetown's public exam described in "Communication," *Federal Gazette & Baltimore Daily Advertiser*, August 6, 1798, 3.

Jesuit *Ratio* where geography and mathematics held a confirmed place, Carroll's scheme changed *when* these subjects appeared before students by introducing them straight away and not waiting until after a student had worked his way through multiple years of discipline-inducing studies in rhetoric and grammar. Instead of making geography and mathematics function as subjects complementary or accessories to the higher-ranking humanities, Carroll set out to teach them as subjects valuable in their own right, a precedence detectable in his plan where he wrote on teaching mathematics and geography ahead of his guidelines about the usual paramounts of Latin and Greek. This tweaking of curricular priorities might appear minor, but in the context of starting a new Catholic academy in America, Carroll's move away from the traditional *Ratio* showed a sense of independence that developed during the post-Jesuit suppression 1780s when he fashioned a new mission for himself to succeed the one he lost through the suppression of the Jesuit order. Thus, his planning and the actualization of Georgetown became, in part, a personal renewal through founding an institution of higher education that would become, as he wrote in 1789, "our main sheet anchor for religion" and, in time, much more.[7]

However, getting this anchor securely planted proved difficult as Georgetown encountered many obstacles in its early years. Staffing difficulties frequently cropped up within the institution that, at times, hampered instruction in science-related subjects. In 1796, for

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[7] The *elements* meaning Euclid's Elements. Government of Georgetown College, 1791, in Hanley (ed.), *The John Carroll Papers: Volume 1, 1755-1791*, 484. For Geography and mathematics in the *Ratio*, see Claude Pavur, *The Ratio Studiorum: The Official Plan for Jesuit Education* (Saint Louis: Institute of Jesuit Sources, 2005), "Rules for the Professor of Mathematics," 109. On Americanization of the *Ratio* at Georgetown, consult Daniel L. Schlafly, Jr., "The *Ratio Studiorum* on Alien Shores: Jesuit Colleges in St. Petersburg and Georgetown," *Revista Portuguesa de Filosofia* 55 (1999), 253-274, esp. pgs. 266-272. Maurice Whitehead, *English Jesuit Education: Expulsion, Suppression, Survival and Restoration, 1762-1803* (Surrey: Ashgate Publishing Limited, 2013) explains the European context in which Carroll received his overseas Jesuit experience, especially while he was a student in Liège. On Carroll and Catholics during the 1780s, see Ronald A. Binzley, "Ganganelli's Disaffected Children: The Ex-Jesuits and the Shaping of Early American Catholicism, 1773-1790," *U.S. Catholic Historian* 26 (2008), 47-77 and Philip Gleason, "The Main Sheet Anchor: John Carroll and Catholic Higher Education," *The Review of Politics* 38 (1976), 576-613. "Main Sheet Anchor" quote comes from an October 23, 1789, letter to Charles Plowden, in Hanley (ed.), *The John Carroll Papers: Volume 1, 1755-1791*, 389-390.

example, when there was a vacancy for an instructor "capable of teaching the principles of mathematics, algebra, geometry, etc., and thoroughly acquainted with the English language," Georgetown advertised this essential teaching position in the local newspaper, which resulted in lay instructor John Wilson being hired at an £112 annual salary. But when Georgetown needed to reduce spending, Wilson's salary was cut to £75 per annum, a decision that prompted him to part company with the institution in 1798. Staffing problems in science-related subject areas evidently persisted given that Carroll, in 1800, "at the request of the Presidt. of Georgetown College," wrote to the head of a group of ex-Jesuits asking, "if one or the other among you are able to serve in philosophical disciplines, and [have] been well instructed in physics and mathematics and not at all ignorant of the English language." While employing a clergyman in a teaching position might yield better service loyalty (and at a reduced cost), the greater fact remained that filling necessary science-related positions, whether by digging deeper into a restricted budget or by looking across the Atlantic, proved a continuing problem.[8]

Varying student enrollments also hampered Georgetown's progress by making planning difficult for its administrators, particularly the balancing of tuition revenues and teaching expenses. From its initial cohort of 69 students in 1791-92, Georgetown's enrollment reached a high of 86 during the mid-1790s, only to be followed by a drop down to 58 students in 1799 – a decline due in part to competition from various institutions. Locally, Georgetown needed to contend with academies like the Columbia Academy started by Presbyterian minister Stephen B. Balch in 1794, that, like Georgetown, also mobilized science in its newspaper advertisements by

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[8] "Advertisement," *Federal Gazette & Baltimore Daily Advertiser*, May 4, 1796, 1. About Wilson, see Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 49, 51. In 1800, Georgetown's President was Most Reverend Leonard Neale, S.J. Carroll quotation from a letter dated October 27, 1800, to Nicholas Paccanari (of the Fathers of the Faith), Thomas O'Brien Hanley, S.J. (ed.), *The John Carroll Papers: Volume 2, 1792-1806* (Notre Dame: University of Notre Dame Press, 1976), 323-325, pg. 324. About Paccanari and his position as superior-general of the Society of the Sacred Heart of Jesus, see Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 13:306-308.

addressing its readers as "Patrons of Science." Parents most likely welcomed this selection in schools for their sons where an institution's status per science along with its religious affiliation served as important decision factors. However, to Georgetown's probable benefit, Columbia Academy struggled with its own problems in trying to teach science as it had to charge an admission fee to hear its young students "deliver some orations, dialogues, etc.," so the school "may be enabled to furnish a set of globes, maps, etc. for its use." After some years and under a new college president, the Rev. William Dubourg, a Sulpician of French background, Georgetown announced a strengthened curriculum that included natural philosophy for the first time as its 1798 prospectus described that "the sphere of education in this college was, for a time, unavoidably contracted; it has expanded itself gradually, and the college now offers the promising prospect of being a complete nursery of learning equal to those in the United States." While this improved attention to the teaching of science may have boosted Georgetown's status versus its one adjacent competitor, its ability to teach science came nowhere close to the wherewithal of, for example, the Presbyterian College of New Jersey, which had just added a large four-foot reflecting telescope to its natural philosophy apparatus collection. Closer at hand, a new Catholic college in nearby Baltimore entailed an even more unsettling challenge.[9]

[9]A list of Cuban students at St. Mary's appears in Manuel Valdés Rodríguez, "Consideraciones Historico-Criticas sobre la Segunda Enseñanza en Cuba," *Revista de la Facultad de Letras y Ciencias* 7 (1907), 324-334, pgs. 332-4. Appendix A, Georgetown Student Enrollments, 1791-1889, found in Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 397-8. "Patrons of Science," *The Centinel of Liberty, and George-town and Washington Advertiser*, May 3, 1799, 1. Columbia's student speaking event announced in "Advertisement," *The Centinel of Liberty, and George-town and Washington Advertiser*, March 15, 1799, 1. "College of George-Town, (Potomack) in the State of Maryland, United States of America," prospectus dated 1798, GTUA. The word 'nursery' in this new prospectus probably comes from the French word *pépinière* and was meant to denote a 'religious seminary' by its likely author, William DuBourg, formerly of France and Georgetown's third president from 1796-98; see Annabelle M. Melville, *Louis William DuBourg: Bishop of Louisiana and the Floridas, Bishop of Montauban, and Archbishop of Besançon, 1766-1833* (Chicago: Loyola University Press, 1986), 1:50. Telescope arrival to the port of Philadelphia described in "Philadelphia, February 8," *New York Gazette and General Advertiser*, February 10, 1798, 3.

Expansion to Baltimore

In August 1799, three young Cuban boys arrived in Baltimore in the care of former Georgetown president William DuBourg to commence study at St. Mary's Seminary. Founded in Baltimore in 1791 by a small band of French Sulpicians who came to America to flee persecution amid the French Revolution, this Catholic institution had found little success in attracting vocations to the church and, for the few it did attract, seeing them through to final ordination. DuBourg, himself a Sulpician, wanted these boys not for the priesthood, but as students in a new college that would draw mainly from West Indies. As his new college would not compete directly with Georgetown for pupils, Bishop Carroll, in 1800, gave his reluctant permission for DuBourg's new enterprise. After three years of successful instruction, a crisis arose in May 1803 when the Cuban authorities recalled its citizens from the institution, a move that left DuBourg with an all but empty college. Confronted with the possible failure of his promising institution after several years of hard work, DuBourg unilaterally declared that his college would now accept students of all religious creeds and nationalities and soon commenced to publicize his "Baltimore French College." For Bishop Carroll who wrote in 1802 that "the college of G.Town does not at present flourish in the number of students," there was little choice but to allow DuBourg's institution to go forward in this new configuration as this college had shown good potential for success. While limited building space impeded growth for a time, St. Mary's College, as this Sulpician institution was officially named, in October 1803 became the second door to American Catholic higher education and a promising pathway for the teaching of science, and hopefully one that would avoid the missteps Georgetown made.[10]

[10] St. Mary's history well told in James Joseph Kortendick, S.S., "The History of St. Mary's College, 1799-1852," unpublished M.A. thesis, Catholic University of America, 1942, and in in Melville, *Louis William DuBourg: Bishop of Louisiana and the Floridas, Bishop of Montauban, and Archbishop of Besançon, 1766-1833*, 1:82-122. About the Sulpicians in the United States, consult Christopher J. Kauffman, *Tradition and Transformation in Catholic Culture:*

Like Georgetown's prospectus sixteen years earlier, St. Mary's advertising mentioned keeping a firm watch on student morals ("moral and religious habits are instilled into their tender minds by all possible means") and described a conventional curriculum that predictably included the dead languages of Latin and Greek (listed first) and natural philosophy (listed last). Practical subjects such as mercantile arithmetic and drawing were also identified. While these two colleges shared similar curricula, including nominal attention to science, and operated in urban areas claiming comparable populations, by 1805 their respective enrollments differed significantly as St. Mary's had jumped up to over 125 students while Georgetown's fell to 40 pupils, suggesting that non-curricular factors stood behind these feast and famine figures. Indeed, while Baltimore enjoyed a growing prosperity in being a major commercial center and seaport, Georgetown and the District of Columbia languished economically "as the political relationship of the community and federal government remained unsettled." That "nearly six hundred ladies and gentlemen assembled" to observe the August 1805 public examinations of St. Mary's students further substantiated the good health of the college with the Baltimore public. The Maryland state legislature signaled its endorsement of St. Mary's when it authorized the college to "admit any of the students in said seminary to any degree or degrees in any of the faculties, arts, and sciences, and liberal professions" such that "no religious test or persuasion shall ever be considered as a requisite." The school quickly exercised this new privilege; in 1806, it conferred

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The Priests of Saint Sulpice in the United States from 1791 to the Present (New York: Macmillan Publishing Company, 1988), esp. pg. 47-53, and Charles G. Herbermann, *The Sulpicians in the United States* (New York: The Encyclopedia Press, 1916). "Baltimore French College," *City Gazette and Daily Advertiser*, December 19, 1803, 3. Carroll's comment in an 1802 letter to Charles Plowden, in Hanley (ed.), *The John Carroll Papers: Volume 1, 1755-1791*, 382-385, pg. 383.

its first six degrees, thus letting St. Mary's sail around the drifting Georgetown College and, in effect, become the flagship of American Catholic higher education.[11]

The occupational pursuits of former St. Mary's students reveal an obvious consistency with their received classical education and include a few traces of science. Robert Walsh, who had finished his studies before the college could award degrees in 1802, belatedly received his A.B. and A.M. degrees in 1806. Initially, he pursued a career in law and gained admittance to the Maryland and Pennsylvania bars. In 1810, he assumed the editorial duties for *The American Register, or General Repository of History, Politics and Science* when, later on in 1817, he editorialized that "the most durable national glory is that which results from a pre-eminence in science and literature," which allowed him then to advocate for a national Catholic university. Charles Tiernan attended St. Mary's from 1809 to 1816, but did not receive a degree, an outcome of little impediment to a successful career in his father's shipping and general commission merchandising business, nor acting as the consul for the Mexican government in Baltimore for twenty years. His surviving mathematics textbook, *Cours de Mathématiques: Tome Troisieme Mecanique* by Charles Bossut, shows his handwritten name and the date "Oct 5, 1813," which places this encounter with the mathematical treatment of statics and dynamics in his fourth year as a student. An 1812 graduate, Franklin Didier practiced medicine in the Baltimore area and was an "assiduous contributor to leading periodicals." When he studied natural philosophy at

[11] "Baltimore French College," City Gazette and Daily Advertiser, December 19, 1803, 3, which can be compared with "Georgetown College," *National Intelligencer, and Washington Advertiser*, July 27, 1804, 1. St. Mary's and Georgetown enrollment counts from Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 56, 397. Constance McLaughlin Green, *Washington: Village and Capital, 1800-1878* (Princeton: Princeton University Press, 1962), 1:29. "The Examinations of the Students of St. Mary's College," *Federal Gazette & Baltimore Daily Advertiser*, August 27, 1805, 2. William Kilty, et al. (eds.), *The Laws of Maryland from the End of the Year 1799, with a Full Index, and the Constitution of This State, as Adopted by the Convention, with the Several Alterations by Acts of Assembly: and an Appendix Containing the Land Laws; with the resolutions Considered Proper to be Published* (Annapolis: J. Green, 1820), 3:464-465, published in Volume 192 of the Archives of Maryland Series, Maryland State Archives. Degrees Conferred by St. Mary's College, 1806-1852, Record Group 3, Box 12, ASUSA, 1.

St. Mary's, he used his own handwritten copy of the *Elements of Natural Philosophy, Confirmed by Experiments* as "composed and dictated by the Rev. Mr. Pasquiet, Presid of St. Mary's College, Baltimore." With or without formal degrees, these students enjoyed agreeable careers facilitated in no small way by a classical education that included a modicum of serviceable science as they pursued occupations germane to the times.[12]

During these formative years, St. Mary's College did well in having able faculty to teach science and related subjects. From 1802 to 1825, the college benefitted from the many talents of French-born mathematics professor Louis I.M. Chevigné. Having studied engineering in Paris before he came to America in 1796, this versatile lay instructor not only taught a full range of mathematics from basic arithmetic to fluxions, but he also published in 1806 a "Mathematical Manual for the Use of St. Mary's College" which described arithmetic as "the science of numbers." This text set an array of practical problems before the student, such as mercantile arithmetic questions dealing with simple and compound interest to time/distance problems that were localized to the region as in one algebra word problem that opened with "A courier starts from Baltimore for New York . . . ." Another French expatriate, secular priest Jean Baptiste Paquiet, reached Baltimore in 1802 where he found satisfying employment with St. Mary's as their professor of natural philosophy. Paquiet held this position until 1812 when he was elected

[12] Mary Frederick Lochemes, *Robert Walsh: His Story* (New York: American Irish Historical Society, 1941), esp. pg. 26 and pg. 60. Robert Walsh (ed.), *The American Register; or Summary Review of History, Politics, and Literature* (Philadelphia: Thomas Dobson and Son, 1817), 1:xx-xxv. Odd to see 'Science' dropped from the title as this issue contained over 30 pages dedicated to the "Scientific Labors" of Professor Cooper of Philadelphia, pgs. 419-450. Charles B. Tiernan, *The Tiernan Family in Maryland: As Illustrated by Extracts from Works in the Public Libraries, and Original Letters and Memoranda in the Possession of C. B. Tiernan* (Baltimore, Md.: Gallery & McCann, 1898), 143-167. Uncatalogued copy in the STMSUA archive of Charles Bossut, *Cours de Mathématiques: Tome Troisieme Mecanique* (Paris: Firmin Didot, 1802). Didier is mentioned in Henry E. Shepherd, *The Representative Authors of Maryland: from the earliest time to the present day, with biographical notes and comments upon their work* (New York: Whitehall Publishing Company, 1911), 51. Uncatalogued bound manuscript of "Elements of Natural Philosophy" found in the STMSUA with "The Property of Franklin J. Didier" written on the front page.

president of this Sulpician college even though he was not a member of this religious order. While at St. Mary's, he "soon acquired a reputation in Baltimore for his merits as a scientist," perhaps due, in part, to the "usual course of lectures on natural and experimental philosophy" available through the college and open to day-scholars and "any other gentleman who may wish to attend." Yet when French Sulpician Simon Gabriel Bruté arrived in 1810, a clergyman with a solid science background from completing medical school in Paris prior to his taking of holy vows, he was tasked not with teaching science, but with teaching moral philosophy, a subject in keeping with the college's advertised goal to instill moral habits in its students, with Bruté's religious fervor, and with the Sulpician mission of educating would-be clerical candidates in their religious calling. Science would be served at St. Mary's, but not at the unthinking expense of religion.[13]

Given its location in prosperous Baltimore, a capable mix of clerical and lay instructors teaching a traditional curriculum well attuned to the times with modest attention to science, and the stable long-term administration of Sulpician William DuBourg, St. Mary's College performed well in addressing the higher education demands of Catholics and non-Catholics alike. When DuBourg handed the presidency over to Paquiet in 1812, the college enjoyed a good reputation with ample enrollments, had 30 degreed alumni to its credit, resided with a

[13] See Chevigné's obituary, "Tribute of Gratitude and Respect," *Baltimore Gazette and Daily Advertiser*, April 18, 1826, 2, about his life details; he is also mentioned in Joseph William Ruane, *The Beginnings of the Society of St. Sulpice in the United States (1791-1829)* (Washington, D.C.: Catholic University of America, 1935), pgs. 148-149. L. I. M. Chevigné, *Mathematical Manual for the Use of St. Mary's College of Baltimore; containing four parts* (Baltimore: John West Butler, 1806), vol. 1, quotes from pgs. 5 and 262. About Paquiet, see Herbermann, *The Sulpicians in the United States*, 106 , 111, 114. Lectures announcement in "St. Mary's College," *Federal Gazette*, September 10, 1810, 1. About Bruté, see Ruane, *The Beginnings of the Society of St. Sulpice in the United States (1791-1829)*, 172, Theodore Maynard, *The Reed and the Rock: Portrait of Simon Bruté* (New York: Longmans, Green and Co., 1942), 67, Mary Salesia Godecker, *Simon Bruté de Rémur, First Bishop of Vincennes* (St. Meinrad, Indiana: St. Meinrad Historical Essays, 1931), 20-42, and the dissertation by Albert Henri Ledoux, "The Life and Thought of Simon Bruté: Seminary Professor and Frontier Bishop," unpublished dissertation, Catholic University of America, 2005.

flourishing companion seminary, and endured a worrying debt problem that, in Archbishop Carroll's opinion, "almost ruined both college and seminary." In contrast to St. Mary's success, Georgetown continued to struggle with administrative disarray, declining enrollments, and staffing issues, all intensified by clashes over control between the local college corporate directors and overseas Jesuit authority, problems that caused Archbishop Carroll, one of its staunchest supporters, to lament that the college had "sunk to the lowest degree of discredit."[14]

Female Education gets its turn

Bishop Carroll's support of education as a way of "guarding and improving the morals of youth" applied to female as well as male students. In a 1785 letter to the Prefect of the Congregatio de Propaganda Fide, Cardinal Leonardo Antonelli, Carroll expressed his concerns about "the rather free conduct of the young people of both sexes" and mentioned as an example the "unbelievable eagerness, especially among girls, to read novels which are brought here in large numbers." As a first step towards the creation of an institution for the instruction of young girls, Carroll hoped to attract the services of an established European order of religious women who could supervise this much needed schooling. A friend in Rome wrote Carroll to advise that "a house of Ursuline nuns, or of any other who by institute make a profession of educating female youth, might be of singular advantage in the provinces contiguous to your own residence [in Baltimore]," thoughts that Carroll acknowledged in a later letter when he wrote "Mr Chs.

[14] According to Carroll, St. Mary's "contains far more Protestants than Catholic," see his letter to Charles Plowden dated Jan 10, 1808, in Thomas O'Brien Hanley, S.J. (ed.), *The John Carroll Papers: Volume 3, 1807-1815* (Notre Dame: University of Notre Dame Press, 1976), 35-37. In 1808, Carroll became the archbishop of the sees of New York, Philadelphia, Boston, and Bardstown. Carroll quote in letter to Charles Plowden dated December 12, 1813, Hanley (ed.), *The John Carroll Papers: Volume 3, 1807-1815*, 246-248, pg. 247, and Carroll's second quote in a letter to Plowden dated January 27, 1812, in Hanley (ed.), *The John Carroll Papers: Volume 3, 1807-1815*, 173-175, pg. 175. Details about conflicts over control discussed in Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 64-67.

Neale of Antwerp is eager to introduce Teresians [Belgian Carmelites]. I wish rather for Ursulines."[15]

Carroll's preference for Ursulines was understandable given this order's extensive history in the education of young girls. Founded by Angela Merici in Italy in 1535 and recognized in 1544 by Pope Paul III (four years after his approval of the Jesuit Order in 1540), the Ursuline Order lived under a constitution that rejected traditional monasticism and, in its place, allowed the pursuit of both spirituality and teaching. Over the next two centuries Ursuline houses reached beyond Italy into greater Catholic Europe where young girls could receive an education that included reading, writing, arithmetic, and practical skills such as needlework. In 1727 a group of French Ursulines arrived in New Orleans and quickly established an academy for girls in addition to an orphanage and hospital, the firsts in what would become the United States. However, at the time of Bishop Carroll's letters, this acclaimed Ursuline institution operated in a city and territory controlled by Spain where Bishop Carroll asserted no religious authority. Thus, Carroll needed to secure help from elsewhere with imparting female education.[16]

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[15] Letter to Leonardo Antonelli dated March 1, 1785, Hanley (ed.), *The John Carroll Papers: Volume 1, 1755-1791*, 179-185, pg.180. Letter from John Thorpe to Carroll dated January 16, 1788, in Annabelle M. Melville, *John Carroll of Baltimore: Founder of the American Catholic Hierarchy* (New York: Scribner, 1955), 170. Letter to Charles Plowden dated Mary 26, 1788, Hanley (ed.), *The John Carroll Papers: Volume 1, 1755-1791*, 311-312, pg. 312.

[16] "The Ursulines" in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 15:228-229. Early details of Ursuline education and the duality of Ursuline goals of spirituality and education, consult chapters 4 and 6 respectively in Laurence Lux-Sterritt, *Redefining Female Religious Life: French Ursulines and English Ladies in Seventeenth-Century Catholicism* (Aldershot: Ashgate, 2005). How teaching by the Ursulines and other religious orders fit into European social life for women during this time period explored by Olwen Hufton, *The Prospect Before Her: a history of women in Western Europe (Volume 1: 1500-1800)* (New York: Alfred A. Knopf, 1996). Regarding the Ursuline order in New Orleans, see Jane Frances Heaney, et al., *A Century of Pioneering: A History of the Ursuline Nuns in New Orleans, 1727-1827* (New Orleans: Ursuline Sisters of New Orleans, Louisiana, 1993) and Emily Clark, *Masterless Mistresses: The New Orleans Ursulines and the Development of a New World Society, 1727-1834* (Chapel Hill: University of North Carolina Press, 2007).

In the summer of 1790 four Belgian Teresian nuns led by an abbess "superiorly distinguished for accomplishments and piety," the prioress Mother Bernadina Mathews, arrived in New York and soon established themselves in Maryland near Port Tobacco. These nuns had escaped religious troubles on the Continent and now, with the help of Carroll and the Rev. Charles Neale, worked to create the first Catholic convent on American soil. Here they lived in seclusion and remained apart, being content to follow their order's constitution which demanded the practice of religious perfection and not, to Carroll's serious frustration, the education of young girls. With the Pope's endorsement, Carroll suggested to Mother Bernadina that, about the "defects of education in these states, [that] you might sacrifice that part of your institution to the promotion of a greater good" to engage in "the education of young persons of your own sex." Carroll would be rebuffed in his attempt to convince these religious women, where piety trumped science, to assist in the education of American girls and understandably complained a decade later that these Teresians "will not concern themselves in the business of female education."[17]

In 1793 three Poor Clares, or Capuchin, nuns arrived from France and Bishop Carroll, forgetting all past disappointments, now placed his aspirations for female education with them. "Although they are not fitted for the education of girls, partly because of inexperience and partly because of ignorance of our language, I nevertheless urged them to apply themselves to that most useful activity. And they do so." In 1798 they opened the George-town Academy for Ladies under the direction of their abbess, Mother Marie de la Marche, and the Rev. Leonard Neale,

[17] From the 1790 letter titled Address from the Roman Catholics of America to George Washington, Hanley (ed.), *The John Carroll Papers: Volume 1, 1755-1791*, 409-411, pg. 409. March 1, 1793, letter to Bernadine Matthews, Hanley (ed.), *The John Carroll Papers: Volume 2, 1792-1806*, 84-85, pg. 84. See Charles Warren Currier, *Carmel in America: A Centennial History of the Discalced Carmelites in the United States* (Baltimore: J. Murphy & Co., 1890), for more details about these Teresians. Background on the troubles faced by Catholic sisters (and priests) coming from France explored in Nigel Aston, *Religion and Revolution in France, 1780-1804* (Washington, D.C.: Catholic University of America Press, 2000). Carroll's complaint about the Teresians is noted in a letter to Charles Plowden, September 3, 1800, in Hanley (ed.), *The John Carroll Papers: Volume 2, 1792-1806*, 316-320, pg. 319.

then President of Georgetown College. While de la Marche and Neale safeguarded the mores of their young pupils by conducting the academy with "singularly commendable piety," they broke convention with an expanded curriculum that went beyond the traditional subjects of reading, writing, and arithmetic due in part to subjects being taught at competing female academies, such as the Baltimore Young Ladies' Academy which showed itself being attentive to American educational needs by teaching geography, the use of globes, and cyphering. Here de la Marche and Neale promoted the school's adapted curriculum by advertising that "a French clergyman, very eminent in science . . . will teach the French languages, geography, writing and arithmetic." Thus, under this rubric of religion and science, the George-town Academy for Ladies began to address Carroll's goal of offering female education.[18]

Like Georgetown and St. Mary's colleges, this female academy accepted both Catholics and non-Catholics. Its 1804 prospectus stated, "the presiding ladies are entirely of the Catholic profession, yet when parents of a different persuasion request an admittance of their children they will not be refused." To provide a "correct education" for female youth, the curriculum embraced the basics of "spelling, reading, writing, English grammar, [and a] general system of arithmetic" along with practical "sewing, embroidery, [and] tambour work" subjects. As to science, natural history now appeared on the list of taught subjects along with geography. Given the basic level of instruction being offered, no certificates or degrees would be awarded; thus, the

[18] Letter to Leonardo Antonelli in Hanley (ed.), *The John Carroll Papers: Volume 2, 1792-1806*, 93-98, pg. 94. Carroll's comments on the nun's work in a letter to Nicholas Paccanari dated October 27, 1800, Hanley (ed.), *The John Carroll Papers: Volume 2, 1792-1806*, 323-327, pg. 325. The early history of the female academy in Eleanore C. Sullivan, *Georgetown Visitation Since 1799,* 2nd ed. (Washington, D.C.: Georgetown Visitation Monastery, 2004) 43-54. esp. pgs. 50-51. About Leonard Neale, see his biography in Herbermann, et al. (eds.), *The Catholic Encyclopedia*,. 10:728-729. Advertisement of the Baltimore Young Ladies' Academy in "Baltimore Young Ladies' Academy," *Centinel of Liberty and George-town Advertiser*, September 6, 1796, 1. Early academy curriculum given from "George-town Academy," *Centinel of Liberty and George-town Advertiser*, March 8, 1799, 3. No name was given for the soon-to-arrive French clergyman. How science came to be taught to American girls, particularly geography, discussed in Tolley, *The Science Education of American Girls: A Historical Perspective*, 13-34 (chapter 1: *Geography Opens the Door*).

academy could operate sans any official charter. However, the academy did carry out academic exercises where students could put their learning (and their academy) on public display as on the evening of April 7, 1804, when each class of students read "pieces judiciously chosen for the occasion" after an opening of song and prayer. "To see literature flourishing in seminaries of female education," wrote one reviewer, "connected with pious instruction, must be pleasing to every friend of humanity and religion." It would no doubt have been pleasing to Bishop Carroll too.[19]

In the same year the academy opened, the three Poor Clares nuns received into their Georgetown convent three devout women who, at the suggestion of the Rev. Neale, traveled from Philadelphia to pursue vocations with the French sisters. At least one of the new arrivals became an instructor at the academy when de la Marche announced in 1799 that "a very respectable lady, recommended to her by Mr. Leonard Neall" and "having received a very liberal education in London, will teach the English grammar and embroidery, which branch she can teach to perfection." This expanded academy staff of French and American origins proved fortuitous when in 1804 de la Marche died and the two remaining French nuns decided to return to France, leaving the academy in the hands of now just a few Americans. Although they were "exceedingly anxious to bind themselves more closely to God by entering into an approved religious order, whose institute embraces the education of young persons of their own sex," as Bishop Carroll wrote in 1805, the women maintained their commitment to the academy and their vocations. Over a decade passed before the Visitation Order, a group founded in France in 1610, took formal charge of the convent and provided much needed resources such as books and holy

[19] "A Prospectus of the Young Ladies Academy," *Washington Federalist*, April 20, 1804, 3. Public exercises of the young ladies academy reviewed in "Communication," *Gazette of the United States*, April 13, 1804, 1.

objects. During these interim years, Bishop Carroll, by balancing formal church rules against practical realities, found a way to establish a much-desired institution for the education of young girls that, while guarding their morals, taught science. Like Georgetown College which helped to inspire many future Catholic male institutions, Georgetown Visitation served this purpose for coming female Catholic institutions.[20]

Georgetown working to survive

When William DuBourg relinquished the Georgetown presidency in 1798 with no little hesitancy over discord with the college's directors, enrollment stood at 70 students. Over the next 14 years, enrollment failed to top this number, averaging a little over 47 students and slumping to a low of 33 in the 1805-06 term. For this same period, four individuals held the college presidency at five different times and with each president came a change in basic policies. For example, when the Rev. Leonard Neale came into office, he quickly dispensed with most of the lay faculty (faculty which DuBourg had hired) and placed additional rules in effect that reduced the number of non-Catholic students to a negligible level, actions taken in part to promote the development of new vocations. None of this went unobserved. Bishop Carroll wrote about these contentious new rules in a letter where he remarked that Neale "deter[s] parents from sending their sons thither by some rigorous regulations not calculated for the

[20] "George-town Academy," 3. Letter to Irish Jesuit Thomas Betagh dated July 14, 1805, in Hanley (ed.), *The John Carroll Papers: Volume 2, 1792-1806*, 483-484, pg. 483. Carroll's views on women receives good attention in Mary Ann O'Ryan, John Carroll: First Bishop of Baltimore and his views on Women, Working Paper Series, Cushwa Center for the Study of American Catholicism, Notre Dame University, 1991, esp. pgs.14-24. Additional details about Georgetown Visitation and other early American Catholic academies as it concerned literacy for young girls offered in Carol Mattingly, *Secret Habits: Catholic Literacy Education for Women in the Early Nineteenth Century* (Carbondale: Southern Illinois University Press, 2016).

meridian of America." And American parents took note of the situation and reacted as well – by enrolling their sons elsewhere.[21]

As pointed out earlier, Georgetown's 1798 prospectus confessed that the institution's "sphere of education" had "for a time, unavoidably contracted," but noted that its curriculum had expanded itself to make the college "a complete nursery of learning" where, it extolled, advanced students could study natural philosophy and other "higher sciences." These curricular aspirations proved short-lived. By 1804, the college's advertised curriculum no longer spoke of natural philosophy in a course of studies that embraced "all the branches of classical education" while offering only the accessories of science via the "use of the globes, arithmetic, and when sufficiently advanced algebra and geometry." A lone hint of science appeared in regard to tuition where students who would continue "their education through the classes of philosophy, on account of extraordinary expenses and some particular indulgencies allowed them" had to pay $250/year versus the usual $220/year, in effect a surcharge on, if not a deterrent to, learning science. Although Georgetown did not waver from its "properly classical" curriculum, the college did solicit parents concerning their sons about "how long they propose to leave them at the College, and for what employment in life they are designed," making it possible for "those destined for the commercial line" to get lessons in "arithmetic and bookkeeping under a particular professor appointed for that purpose." By teaching subjects which addressed actual needs in lieu of rigid adherence to a set curriculum, an adjustment sanctioned by the *Ratio Studiorum* which would have familiar to Carroll and other former Jesuits, Georgetown might

[21] From Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, see pgs. 51-52 about DuBourg's withdrawal from Georgetown; enrollment and president details from pg. 397 and pg. 404; and Neale's presidency discussed on pgs. 52-6. Carroll letter to Charles Plowden on March 12, 1802, Hanley (ed.), *The John Carroll Papers: Volume 2, 1792-1806*, 383.

obtain a few extra students during a period of low enrollments, students whose added weight helped to keep the college away from the rough shoals of failure.[22]

Outwardly, Georgetown's routine remained little changed. The college stayed in the public eye though its regular student examinations where "parents and the friends of literature" enjoyed "a full display of [student] talents and acquirements." Student educational accomplishments were also celebrated by publishing their names in the local newspaper where now five class levels of Latin received premiums along with premiums for the commercial subjects of bookkeeping and arithmetic. At an 1809 public examination, students put on view their abilities not just in "Latin, Greek, and French," but also their facility "in Euclid's Elements, in Algebra, and in the solution of sundry problems on a terrestrial globe" which, according to comments in the local newspaper, were presented "with facility and precision." While the college remained stalled for enrollments, at least parents and the surrounding community would have seen the college maintaining fidelity to its advertised curriculum and teaching methods with its existing students.[23]

Internally, however, the institution underwent more than a few far-reaching changes. Besides the periodic turnover in the president's office and other positions, ownership and authority shifts left enduring marks. Initially, ownership of the Georgetown property was held by Bishop Carroll and two other officials, a straightforward solution that allowed the institution to advertise itself under the president and director's names. In 1798, the title was passed to a Maryland-based legal entity established six years earlier, the Corporation of the Roman Catholic

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[22] Georgetown prospectus dated 1798, GTUA. The 1804 curriculum details appeared in "George Town College," *National Intelligencer, and Washington Advertiser*, July 13, 1804, 4. About flexibility in the Ratio's rules, see Pavur, *The Ratio Studiorum: The Official Plan for Jesuit Education*, 29.

[23] "George-Town College Notice," *Washington Federalist*, May 22, 1805, 2. "A List of the Students of George-Town College who obtained Premiums in their Respective Classes," *The Monitor*, August 30, 1808, 3. "For the National Intelligencer," *National Intelligencer and Washington Advertiser*, April 21, 1809, 1

Clergymen, "in order to give perpetuity to [the] said institution" and, more significantly from the college's viewpoint, valuable recognition from the state government. Subsequent to the 1805 restoration of the Society of Jesus in the United States when many American-based Jesuits renewed their original vows, this order's ability to guide their American renewal improved dramatically, especially for issues of education where Robert Molyneux, a Jesuit who was Georgetown's second president, again took charge of the college and the order's Maryland Mission. Under this refreshed Jesuit imprimatur, a novitiate opened straight away at Georgetown which promptly accepted eleven candidates, including eight former Georgetown students. While this placed further demand on an already shorthanded staff, Molyneux was in a position to call on overseas Jesuits for assistance, a call that yielded a number of talented individuals, including one highly qualified in science - Giovanni Grassi. Although the college's upgrade in legal status had little immediate impact, the new novitiate soon bore fruit by begetting James Wallace, a novice gifted in mathematics and science. Thus, with this additional support coming from old-hand Jesuits along with recent initiates, Georgetown gained appreciable strength in the teaching of science.[24]

In 1805, James Wallace, an Irish émigré in his early twenties, came to Georgetown to take up a position as a lay mathematics instructor. Having taught at Columbia College in New York City for several years, his teaching background also included providing "Evening Tuition" to "young gentlemen . . . who are desirous of improving themselves" across a general range of mathematics and science, principally in the use of globes, geometry, trigonometry, navigation and surveying (Wallace noted that he supplied the "principal instruments required"), fluxions,

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[24] Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 24, 51, and 57-58. "An Act to enable the corporation of the Roman Catholic Clergymen to receive a conveyance . . ." in William Kilty (ed.), *The Laws of Maryland, to which are prefixed the original charter, with an English translation, the bill of rights and constitution of the state, etc.* (Annapolis: Frederick Green, 1800), 2:700.

astronomy, and "natural philosophy according to Sir Isaac Newton." Not only did Wallace fill a critical need at Georgetown, after two years among the Jesuits, in 1807 he fulfilled his own religion calling and entered the Jesuit order where he came a formal part of Georgetown's spiritual community. No longer a lay instructor, Wallace as a Jesuit novice was assigned two years later to the New York Literary Institution, a New York City school started for boys by Anthony Kohlmann, one of the European Jesuits who had answered Molyneux's earlier call for assistance. Science grew at the school, although at a modest level, and, based on a comment from Kohlmann, practical teaching instruments were available as he claimed that "we have the finest set of globes in America." To complement instruction with these globes, Wallace penned a book titled "A New Treatise on the Use of the Globes . . . particularly adapted to the United States" having over 500 pages explaining astronomy and navigation via celestial and terrestrial globes. Although the school enjoyed good attendance, by 1814 it became apparent to Archbishop Carroll that too few Jesuits were available to staff both this New York institution and Georgetown, so he chose to shut down the New York institution. Wallace then came back to Georgetown where he would find the climate for science teaching much improved under the administration of its current president, Giovanni Grassi.[25]

Giovanni Grassi sailed into Baltimore from Liverpool on October 21, 1810, and, after calling on Archbishop Carroll and other Catholic principals, arrived at Georgetown College five

[25] "Evening Tuition," *The Daily Advertiser*, November 20, 1802, 2. Kohlmann quote from letter dated September 14, 1810, in "Unpublished Letters of Father Anthony Kohlmann, S.J.," pg. 74. Wallace, *A New Treatise on the Use of the Globes and Practical Astronomy; or a Comprehensive View of the System of the World*. About Wallace, see Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 81 and 90, Florian Cajori, *The Teaching and History of Mathematics in the United States* (Washington: Government Printing Office, 1890), 77 , 208; and John Hammond Moore, *Columbia and Richland County: A South Carolina Community, 1740-1990* (Columbia, S.C.: University of South Carolina Press, 1993), 132. On the decision to close the New York Literary Institution, see Gleason, "From an Indefinite Homogeneity: Catholic Colleges in Antebellum America," 49.

days later not knowing "what insurmountable task awaited me." At one time destined for the Jesuit China mission, Grassi had received added education in the natural sciences and mathematics as part of his preparation for that assignment. Unable to reach the Far East, he spent several years teaching at Stonyhurst College, a Jesuit institution just outside of Manchester, England, which was keenly committed to teaching and where he "acquired a practical knowledge in the methods used by the English Jesuits in educating youth." Now at Georgetown, Grassi taught mathematics and science aided by a set of mathematical and astronomical instruments he had carried from Europe. Under Grassi's direction, a Jesuit brother at the College constructed additional instruments that showed astronomical concepts, such as the Copernican theory, and a variety of mechanical and hydraulic principles. Not only did Georgetown students benefit from these tools of instruction, but the general public found them worthy of note where "they invited visitors to see them, because in those days better displays could not be found." Grassi displayed his scientific talents beyond the classroom as when he calculated the sun's altitude during the September 17, 1811, eclipse with the purpose of measuring the height of the college's first building. Joined by James Wallace, who returned to Georgetown in 1814, the college's ability to communicate science had reached its strongest level since opening in 1791.[26]

Besides teaching science, Grassi made many administrative contributions at Georgetown. Named president (or rector) of the college and designated as the superior of the Maryland

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[26] Quotations from the English translation from Italian of Grassi's *Memoirs on the Reestablished Society of Jesus in the United State of North America from 1810 to 1817*, as edited by Arthur J. Arrieri, S.J., "The Memoirs of Father John Grassi, S.J.," *Historical Records and Studies, United States Catholic Historical Society* (1959), 196-233, pgs. 197, 216, and 219-220. About science and instruments at Stonyhurst, consult Dana A. Freiburger, "A History of Scientific Instruments at Stonyhurst College, Lancashire, England," *Bulletin of the Scientific Instrument Society* 106 (2010), 20-30. A useful biography of Grassi is Gilbert J. Garraghan, "John Anthony Grassi, S.J., 1775-1849," *The Catholic Historical Review* 23 (1937), 273-292, where his science background and history receives good mention, esp. pgs. 277-280. Numerous articles appeared before and after this 1811 eclipse, such as "The Eclipse of the Sun," *Natiional Intelligencer*, September 19, 1811, 1.

Mission by the Father General of the Jesuit order, Tadeusz Brzozowski, then located in Russia, in October 1811, Grassi took careful steps that improved the college's financial state and physical appearance. For instance, he decreased the annual tuition fee from $220 to $125 to encourage student enrollments from families of limited means, a strategy that proved an immediate success as the next year saw the number of students grow by 50 percent. Then, as befitting his training for the Chinese court, Grassi took time to visit American government departments like the Patent Office and Navy Yard to raise Georgetown's scientific propensities. Of Grassi's ardent work, Archbishop Carroll wrote in December 1813 that "Mr. Grassi has revived the College of Georgetown, which has received great improvement in the number of students and of studies." And of science.[27]

Like Chevigné, Paquiet, and Bruté at St. Mary's College in Baltimore, the talented Wallace along with Grassi made it possible for Georgetown to teach serious mathematics and science. Not only did their abilities strengthen the central mission of the college, they reached beyond into practical scientific issues at the local and national levels. In 1815, the U.S. Congress asked Wallace and Grassi to perform astronomical observations and calculations to better determine the longitude of the nation's capital, a value poorly known at the time. While a more accurate value held obvious practical value, the Georgetown Jesuits lacked the precision instruments needed for the work and had to forgo this request. One year later "in the presence of several hundred spectators," Wallace released an eight-foot diameter hydrogen balloon from the college grounds which rose to a height of 1500 feet before disappearing into the clouds. Carried

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[27] Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 64-68. Garraghan, "John Anthony Grassi, S.J., 1775-1849," pg. 278, pgs. 280-281. Regarding Brzozowski and the Jesuit situation in Russia, see M. J. Rouët de Journel, *La Compagnie de Jésus en Russie: Un Collège de Jésuites a Saint-Péterbourg 1800-1816* (Paris: Perrin et Cie, 1922). Carroll quote from a letter to Charles Plowden dated December 12, 1813, see Hanley (ed.), *The John Carroll Papers: Volume 3, 1807-1815*, 246-248.

out during the school's annual summer vacation, few students likely watched this public demonstration for which Wallace was applauded for his "ingenuity and skill" in devising "this novel and beautiful sight." A striking demonstration of scientific principles "in the presence of several hundred spectators," including individuals who witnessed the balloon's landing 50 miles distant at Cove Point on the Chesapeake, this exhibition gained the Catholic college valuable publicity and no doubt placed in it a desirable light.[28]

As impressive were these revitalizing efforts by the energetic Grassi and his cadre of instructors, a much greater revival took place on August 7, 1814, when Pope Pius VII restored fully the Jesuit order. Though the Jesuit educational tradition had inspired and informed the college's formation and development, now Georgetown could wholly embrace the order's objectives and regulations. One major worry felt by Grassi concerned "seeing our school subject by the government to some non-Catholic university," so with the assistance of the only Catholic in Congress, Representative William Gaston of North Carolina and one of Georgetown's earliest students, Grassi initiated the request for a Federal charter for Georgetown. His petition received swift attention with President James Madison signing his approval on March 1, 1815, to grant Georgetown the power to bestow "any degree in the faculties, arts, sciences, and liberal professions." Having attained institutional independence, the college could continue with its own curricular designs where science, either in support of "academical honors" or useful occupational instruction, had an assured place.[29]

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[28] Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 83. "Aerostation," *Daily National Intelligencer*, August 9, 1816. "The Balloon," *Daily National Intelligencer*, August 12, 1816.

[29] Herbermann, et al. (eds.), *The Catholic Encyclopedia* entry about the Society of Jesus discusses *The Restored Society*, 14:100. Arrieri, "The Memoirs of Father John Grassi, S.J.," 226. Georgetown's Federal charter, GTUA; also published in many newspapers, for example, "An Act Concerning the College of Georgetown in the District of Columbia," *Daily National Intelligencer*, March 7, 1815.

Two years passed before Georgetown was ready to award its first degrees. In July 1817, George and Charles Dinnies, valedictorian and salutatorian respectively, received their Bachelor of Arts degrees in an afternoon ceremony replete with student oratories and music. In the years prior to their graduation, these siblings from New York steadily garnered premiums in mathematics and Latin, achievements reflective of the balance given these subjects within the classical curriculum at Georgetown. At their graduation, the brothers were considered "equals" and shared the "First Class of Mathematics [premium] comprising Spherics, Astronomy, Mechanics, Fluxions, etc," a result no doubt pleasing to mathematics professor Wallace who also taught them "algebra, conic sections, trigonometry, surveying, navigation and use of globes" in prior years. Given the strong teaching of Wallace, the Dinnies brothers decided to remain at Georgetown for a further year of science and mathematics study and, at the 1818 commencement, again came in as equals for the First Class premium in "Metaphysics, Physics, and Chemistry." While no supplementary degree came from this extra year of study, that Georgetown could satisfy their want for additional study shows that Carroll's 1787 aspiration of "communicating science" had been reached.[30]

By the mid-1810s, Carroll's original "proposed institution" had developed into a pair of colleges that enjoyed passable success in offering higher education to Catholics as well as non-Catholics. Georgetown and St. Mary's served their respective local communities of Washington, D.C., and Baltimore owing, in part, to curricula that placed earnest attention on science. Carroll viewed these colleges as "amply sufficient for all the Catholic youths, who, in this and the

[30] Listing of premiums earned by George and Charles Dinnies found in the "List of the Students of Georgetown College," *Federal Republican*, August 5, 1814, 1; "List of the Students of The Georgetown College," *Federal Republican*, August 1, 1815, 2; "List of the Students of Georgetown College," *Daily National Intelligencer*, July 31, 1816; "Georgetown College, D.C.," *Daily National Intelligencer*, August 1, 1817; and "Georgetown College, D.C.," *Daily National Intelligencer*, August 1, 1818.

neighbouring States, could afford to pay for a college education." For young girls, the George-town Academy for Ladies provided fundamental instruction to Catholics and non-Catholics that included modest emphasis on science subjects such as geography and natural history. After decades of labor, Carroll had secured several viable educational footholds in and near to the nation's capital.[31]

However, Carroll's bishopric responsibilities extended far beyond his immediate east coast locale and included out-of-the-way states that needed clergy let alone colleges. With keen awareness of his advanced years and having to endure "all the drudgery of my Episcopal duties," Carroll knew that the responsibility for development in these remote areas must fall to others. For a rural state such as Kentucky with a growing Catholic emigrant population, the undertaking of a new college would involve decided self-reliance and plenty of local resources as Carroll could bestow little in direct support. In effect, Carroll's immediate work was done, but the larger goal to teach science and religion remained for others to complete.[32]

Expansion to the west

Moving among the few hundred scattered Catholic families who settled in the greater Kentucky region during the 1780s and 1790s, one, at times two, Catholic priests ministered to this widely scattered population. Traveling long distances on foot and horseback, these hard-pressed clerics administered the sacraments, performed marriages, and discharged their critical religious duties, often at private homes or "church stations" as they were called. Coverage gaps remained in this large rural area well into the mid-1800s as when the Rev. Charles Nerinckx, a

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[31] Letter dated November 21, 1806, from Carroll to Luke Concanen, in Hanley (ed.), *The John Carroll Papers: Volume 2, 1792-1806*, 536-7.

[32] Letter dated September 11, 1810, from Carroll to Charles Neale, in Hanley (ed.), *The John Carroll Papers: Volume 3, 1807-1815*, 120-21.

freshly arrived priest from Belgium who reached Kentucky in 1805, met an isolated Catholic woman who "wept for joy" when he passed her remote home as she "had not seen a priest for four years." A year later, Nerinckx in turn welcomed a group of Dominican priests led by the Rev. Edward Dominic Fenwick who had come to Kentucky to establish an American mother house for the Dominican order and with the resources of his religious order and Bishop Carroll's full support, soon a college.[33]

When travelling around Kentucky in spring 1805 "to inform myself of the climate, situation and resources," Fenwick learned that the local Catholics, besides making "every generous offer and even importunity to fix among them," also "propose building me a college for the education of their youth." On his return to assume his mission in Kentucky in 1806, Fenwick purchased 500 acres of land near Springfield, about 15 miles southeast of Bardstown, as the foundation for the new Dominican Province of St. Joseph. Here he established St. Rose convent and, in 1807, a novitiate with "12 likely boys who are all inclined to be Dominicans." A church at St. Rose was built "with the cooperation of the people in our congregation, both Catholics and Protestants," as one of the convent's first buildings. However, rooms for the college were deferred as the needed construction materials were not immediately forthcoming as pledged.[34]

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[33] Mary Ramona Mattingly, "The Catholic Church on the Kentucky Frontier (1785-1812)," *Studies in American Church History*, Vol. 25 (Washington, D.C.: The Catholic University of America, 1936), 1-235, pg. 38. W. J. Howlett, *Life of Rev. Charles Nerinckx: Pioneer Missionary of Kentucky and Founder of the Sisters of Loretto at the Foot of the Cross* (Techny, IL: Mission Press, 1915), 106. Also, Camillus P Maes, *The Life of Rev. Charles Nerinckx, with a chapter on the Early Catholic Missions of Kentucky* (Cincinnati: Robert Clarke & Co., 1880).

[34] Fenwick letter to Richard Luke Concanen dated 1 August 2005, William Luke Tancrell, *Edward Dominic Fenwick Papers 1803-1832: Founding American Dominican Friar and Bishop* (New York: The Dominican Province of St. Joseph, 2005), 56-57. Fenwick letter to Robert Angier dated 18 August 1807, Tancrell, *Edward Dominic Fenwick Papers 1803-1832: Founding American Dominican Friar and Bishop*, 87-88, pg. 87. List of pledges for the college and convent listed in V. F. O'Daniel, *A Light of the Church in Kentucky: Or the Life, Labors, and Character of the Very Rev. Samuel Thomas Wilson, O.P., S.T.M., Pioneer Educator and The First Provincial of a Religious Order in the United States* (Somerset: The Rosary Press, 1932), 306-312.

When the college opened in 1809 under the name of St. Thomas Aquinas, the initial curriculum embraced the study of Latin along basic lines: the rudiments, syntax, and reading. The Rev. Samuel Thomas Wilson, one of Fenwick's experienced Dominican brothers with an education from the Bornhem College in Belgium in Sacred Theology, had charge over the college in addition to his duties as Superior of the St. Rose Convent. Advanced novices from the St. Rose novitiate, who Fenwick felt would "all be capable . . . of teaching in our new college," assisted Wilson. Over time, enrollment at the college exceeded one hundred students, both Catholic and non-Catholics, with many coming from the distant states of Missouri, Louisiana, and Indiana as well as Kentucky. Word of this new college had reached far and met with evident approval for many families.[35]

By 1815, "St. Thomas's College" advertised teaching a modest classical curriculum that offered instruction for male students aged 8 to 16 in the dead languages of Latin and Greek, the more practical French and English languages, and in a modest nod toward science: "algebra and geometry, with every other branch of the mathematics, geography, and the use of the globes." No plain mention of science appeared in this 1815 advertisement, nor a listing of instructors, college amenities, or other attractive details given to encourage parents to enroll their sons at St. Thomas such as a list of premiums awarded to students. These few particulars suggest that, after

[35] On Wilson, see O'Daniel, *A Light of the Church in Kentucky: Or the Life, Labors, and Character of the Very Rev. Samuel Thomas Wilson, O.P., S.T.M., Pioneer Educator and The First Provincial of a Religious Order in the United States* and C. F. Raymund Palmer, *Obituary Notices of the Friar-Preachers, or Dominicans, of the English Province, from the year of our Lord 1650* (London: Burns & Oates, 1884), 24. Fenwick quote in letter to Richard Luke Concanen dated 10 July 1808, Tancrell, *Edward Dominic Fenwick Papers 1803-1832: Founding American Dominican Friar and Bishop*, 91-93, pg. 92. About Saint Thomas Aquinas College, see O'Daniel, *A Light of the Church in Kentucky: Or the Life, Labors, and Character of the Very Rev. Samuel Thomas Wilson, O.P., S.T.M., Pioneer Educator and The First Provincial of a Religious Order in the United States*, chapters 13 and 14, 179-194 and 195-207. Further details in Felix Newton Pitt, "Two Early Catholic College in Kentucky: St. Thomas and Gethsemani," *The Filson Club History Quarterly* 38 (1964), 133-148.

six years, the college remained elementary in form and curriculum as it provided a modicum of education in a Catholic setting with little call for or mention of science.[36]

While there were many St. Thomas Aquinas College alumni, including "men of many walks of life, such as politicians, doctors, lawyers, business men, judges, and priests," no official charter came to exist that granted them formal degrees or other certificates. No public examinations of students took place where premiums would be awarded; instead, the boys from the college sang during high mass at the St. Rose church, which attracted "large crowds . . . from every direction." Only the associated novitiate produced any proper graduates when four priests were ordained in 1816, two of which remained at the college to continue teaching for several more years. Rather than maturing as a secular educational institution, St. Thomas served more like an accessory to St. Rose for the promotion of the Catholic religion and preparation of clergy.[37]

By 1819 St. Thomas stood confronted by several severe difficulties. The financial crisis of 1819 had reached Kentucky, which made for fewer families enrolling their sons at the college as well as causing problems with collecting the $125 annual tuition from those who did attend. Back in 1805 when the college was first proposed with a $100 annual tuition fee, the Rev. Nerinckx advised Bishop Carroll by letter "that not half a dozen Catholic parents are able to afford so expensive an education to their children." The consequence, Nerinckx cautioned, would be not "much service being rendered to the missions which are so extensive and numerous." In 1805 Bishop Carroll's decision was to go forward with the college. Fourteen

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[36] St. Thomas's College advertisement dated 1815, in Tancrell, *Edward Dominic Fenwick Papers 1803-1832: Founding American Dominican Friar and Bishop*, 86.

[37] Pitt, "Two Early Catholic College in Kentucky: St. Thomas and Gethsemani," , 136, 138. O'Daniel, *A Light of the Church in Kentucky: Or the Life, Labors, and Character of the Very Rev. Samuel Thomas Wilson, O.P., S.T.M., Pioneer Educator and The First Provincial of a Religious Order in the United States*, 170.

years later, the situation had changed and a new local bishop, the Rev. Benedict J. Flaget, a Sulpician appointed by Carroll in 1808, held sway over the Bardstown Province and St. Thomas. Faced with the decline in enrollments and income at St. Thomas, Flaget shifted the Rev. Wilson and his few novices away from teaching, except at the St. Thomas novitiate, and redirected them to look after the expanding needs of the Kentucky and Ohio mission regions. Now deprived of instructors, the first Catholic college established west of the Alleghenies closed in 1819, a casualty of priorities that favored ministry over education if not religion over science.[38]

Women's education in Kentucky

In contrast to Georgetown Academy for Young Ladies where Bishop Carroll looked to European Catholic sisters to found a school for females, an indigenous spark brought about a new women's institution in Kentucky. "Several young ladies are asking for a house," the Rev. Nerinckx explained in an 1805 letter to family and friends, "where they could live alone in a Christian atmosphere." "The *Lovers of Mary*, as I intend to call them, would not be bound by solemn vows, and some of them would be intrusted with the instruction of poor children and slaves." Their entreaty fit well with Nerinckx's aspirations for his Kentucky mission to further Catholicism and that the women would support themselves "by spinning, weaving, and sewing." But owing to apathy among the young women and a lack of resources, Nerinckx failed in his initial attempt to initiate instruction for young girls. His second attempt also came to a bad end

[38] Murray N. Rothbard, *The Panic of 1819: Reactions and Policies* (New York: Columbia University Press, 1962), 47, 52. Pitt, "Two Early Catholic College in Kentucky: St. Thomas and Gethsemani," , 137 . Letter dated 15 May 1805, from V. F. O'Daniel, "Some Letters of Fathers Badin and Nerinckx to Bishop Carroll," *The Catholic Historical Review* 6 (1920), 66-88, pg. 70. About Flaget, see Herbermann, *The Sulpicians in the United States*, 143-161, *Flaget* in the Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 6:93-94, and M. J. Spalding, *Sketches of the Life, Times, and Character of the Rt. Rev. Benedict Joseph Flaget, First Bishop of Louisville* (Louisville: Webb & Levering, 1852), 287-288. That the Dominicans themselves wanted St. Thomas to close is a view found in John R. Clancy, Rev. (ed.), *The Predecessors of Bellarmine College* (Louisville: Bellarmine College Press, 1955), 3-11, esp. pg. 4.

three years later when a just-finished "convent-school house" fell total victim to a fire. Impervious to failure, Nerinckx's commitment produced success in 1812 when three American women received their veils at St. Charles church under the name "The Little Society of the Friends of Mary under the Cross of Jesus" and became the nucleus of the much-wanted school constructed that same year.[39]

Called the "Sisters of Loretto" in honor of Our Lady of Loretto in Italy, they represented the first American community of Catholic sisters formed with no ties to existing European orders. Under rules crafted by the Rev. Nerinckx, the school soon opened its doors. "The school is forming fast of every denomination," wrote Nerinckx in an 1812 document, where "reading, writing, needle-work, etc, sound morality and Christian politeness, make up the sum of instruction received." The sisters, all native English speakers from Kentucky and known to local families, proved welcoming and their school enrolled 30-40 students in its first year. The curriculum attended to the basics of learning, albeit with no overt mention of science, and served both Catholicism and local community needs by providing a looked-for education for girls. The school, as Nerinckx would write, performed a "necessary work for the religious and public good."[40]

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[39] Nerinckx's letter quoted in Augustin C. Wand, et al., *Documents: Nerinckx--Kentucky--Loretto, 1804-1851, in archives Propaganda Fide, Rome* (St. Louis, Mo.: Mary Loretto Press, 1972), 24; and Maes, *The Life of Rev. Charles Nerinckx, with a chapter on the Early Catholic Missions of Kentucky*, 135-136, 141, 252-264. Also see Margaret A. Hogan, "Sister Servants: Catholic Women Religious in Antebellum Kentucky," unpublished dissertation, University of Wisconsin--Madison, 2008, esp. pgs. 67-71.

[40] Nerinckx's rules were approved by local ecclesiastical authorities and Rome; see Howlett, *Life of Rev. Charles Nerinckx: Pioneer Missionary of Kentucky and Founder of the Sisters of Loretto at the Foot of the Cross*, 257. Maes, *The Life of Rev. Charles Nerinckx, with a chapter on the Early Catholic Missions of Kentucky*, 268-270. Besides education, Catholicism reached out via their striking Kentucky church interiors, see John R. Dichtl, "'She stalks abroad displaying her splendid trappings': Transplanting Catholicism to Kentucky, 1793-1830," *The Register of the Kentucky Historical Society* 97:4 (1999), 347-373.

The school's enrollment grew gradually at first, but the school's situation improved steadily as a handful of students chose to join this women's religious community which increased the order's capacity for teaching. Kentucky-born Ann Hart was the first of these students who later as Sister Agnes played a vital part in the order's growth as the Superior for new schools in Kentucky and Arkansas. By 1816 the number of the sisters tripled and by 1824 they numbered over a hundred with six schools in operation serving young girls across the Kentucky region. By the late 1820s, this improvement in the Sister's general endeavor led to their incorporation under Kentucky law which "encourage[d] all institutions for the dissemination of learning and morality." Named the Loretto Literary and Benevolent Institution, these schools were "open and free for persons of every denomination" and well-positioned the Sisters' to carry out their mission of female education as well as providing greater visibility to Catholicism.[41]

In line with Tolley's argument that geography provided one entrée for science at female schools, the curriculum at Lorenttine schools would broaden in the 1820s to add science-related subjects such as "geography with the use of maps and globes" to existing lessons in practical female skills of sewing and needlepoint. Public examinations became a regular event as well where students put their proficiency on view "before a respectable audience" and received praise "gratifying to their parents and honorable to themselves." While some motivation for this curriculum upgrade came from the challenges posed by neighboring non-Catholic schools, like

[41] About Ann Hart, see Anna C. Minogue, *Loretto: Annals of the Century* (New York City: The American Press, 1912), 46-7, 59, and 112. John R. Dichtl, *Frontiers of Faith: Bringing Catholicism to the West in the Early Republic* (Lexington, Ky.: University Press of Kentucky, 2008), 15. John B. Boles, *Religion in Antebellum Kentucky* (Lexington: University Press of Kentucky, 1976), 67. *Acts Passed at the First Session of the Thirty-Eighth General Assembly for the Commonwealth of Kentucky* (Frankfort: J.G. Dana and A.G. Hodges, Public Printers, 1830), 27-30. A good summary about the Sisters of Loretto is Florence Wolff, *History Sampler of the Sisters of Loretto, 1812-1986* (Nerinx, Ky: Sisters of Loretto, 1986).

Mrs. Grace's *Select School for Young Ladies* in nearby Lexington which also offered instruction in geography and the use of globes and maps, given that the Sisters took classes in science and other higher branches of study at St. Joseph's College in Bardstown, purposes beyond simple competition appeared to be active. "The time is now past when we were obliged to send our daughters to the east for the purpose of receiving a finished literary and scientific education" wrote one observer in 1827, suggesting the Sisters of Loretto had indeed fashioned not only wanted, but attractive Catholic schools.[42]

In 1831 natural philosophy joined arithmetic and plain sewing as subjects offered by the Loretto school which further attested to Kentucky being fertile ground for female education in science. Being self-sufficient for teaching staff and free from ministerial duties, the Lorenttines enjoyed an operational advantage over male institutions where a lengthy priestly education plus an eventual obligation to the pulpit made it more difficult to staff a college (as was the situation for St. Thomas College in 1819), thus giving the Sisters of Loretto a better chance for success to meet the simple goal set by the Rev. Nerinckx in the Lorenttine's constitution to afford "instruction of female youth." But however bright the spark of learning appeared in Kentucky, these female Catholic schools could only teach the essentials especially when it came to science as they could not keep pace with their urban counterparts like Georgetown Visitation in Washington D.C. that could afford to spend thousands of dollars on science teaching apparatus.

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[42] "Through geography, science became an acceptable part of the education of American girls," wrote Tolley, *The Science Education of American Girls: A Historical Perspective*, 34. Course and examination details about the Loretto school from "Communications," *Louisville Public Advisor*, October 3, 1827, 2. Mrs. Grace's school described in "Select School for Young Ladies," *Kentucky Reporter*, December 25, 1820, 4. About the Sister's taking science courses at St. Joseph's, see Minogue, *Loretto: Annals of the Century*, 165, Harold A. Buetow, *Of Singular Benefit: The Story of Catholic Education in the United States* (New York: Macmillan Company, 1970), 75 and Kathleen Vonderhaar, "Journey to Jubilee 1812-2012," *Loretto Magazine* 51:3 (2009), 10-14, pg. 14.

Thus, these institutions did well in meeting the basic educational needs of Kentucky region, but little more.[43]

Growth of Kentucky Catholicism and education

Residing in the amply urban settings of the nation's capital and nearby Baltimore, the Catholic institutions of Georgetown College, Visitation Academy, and St. Mary's College enjoyed close proximity to their Catholic leadership, few barriers to travel, and general easy access to needed resources. However, an urban location was no guarantee of success as when in the early 1810s Georgetown dealt with low enrollments and organizational disorder. In contrast, institutions in Kentucky lay scattered about in small isolated rural Catholic enclaves where free or cheap land proved the main determinant to where an order or group resided and their success depended on being largely self-sufficient along with having committed local leadership, factors exhibited by the Sisters of Loretto under the care of the Rev. Nerinckx. Hence Catholic higher education found success and failure in both urban and rural settings, which suggests other factors, like the direct support of the local bishop, had a critical influence on the founding and persistence of Catholic educational institutions.[44]

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[43] "Loretto Literary & Benevolent Institution," *Bardstown Herald*, January 19, 1831, 4. (FILSON). Shortly after the Sisters of Loretto began in the 1810s, two more Kentucky Catholic women's orders, The Sisters of Charity of Nazareth and The Sisters of St. Mary Magdalen's, formed religious communities in Kentucky and opened schools; see Hogan, "Sister Servants: Catholic Women Religious in Antebellum Kentucky," 76-82 and 82-87. The George-town Academy for Ladies, now called Georgetown Visitation Academy to reflect the name of the female order running it, made two purchases in 1828 of $829.82 and $1618.50¼ for physical and chemical apparatus, see Sullivan, *Georgetown Visitation Since 1799*, 86. The Lorenttine constitution appears in Wand, et al., *Documents: Nerinckx--Kentucky--Loretto, 1804-1851, in archives Propaganda Fide, Rome*, 84-124.

[44] Geographic generalizations about Catholic educational institutions that insist their success "doubtless rested partly on their being concentrated in big urban cities" fail to consider the many beginnings made in rural areas. This quote from Christopher Jencks, et al., *The Academic Revolution* (Garden City, N.Y.: Anchor Books, 1969), 383. A more serviceable geographic overview, one that claims "denominations moving boldly out onto the frontier founded colleges in great numbers" is Gaustad, et al., *New Historical Atlas of Religion in America*, 346-7.

In 1808 when the Vatican approved the creation of a western American See and based in part on counsel that "Bardstown is in the heart of the Catholic settlements," this small Kentucky town of 821 with eight Catholics, three Catholic families, and no Catholic church became the bare center of a vast new Catholic periphery. Embracing three states and three territories, its first bishop, the Sulpician Rev. Benedict Flaget, described this region as extending "about ten degrees of latitude up the left bank of the Mississippi River and almost as many degrees in longitude." With just ten priests besides himself, Flaget's quickly learned on his arrival in 1811 that his diocese contained few resources to minister to its many scattered Catholics let alone tend to their educational needs. Writing to Archbishop Carroll a few months after reaching Bardstown, Flaget acknowledged the many challenges ahead in simple words: "I assure you, dear Father, it will be difficult."[45]

Given this pressing need for more priests, Flaget established a seminary at a donated house close to Bardstown to initiate instruction for a small group of novices already partway in their training. Progress happened slowly as he found that this educational undertaking needed to begin with the "very elements of reading and writing [as] such is the great and almost barbaric ignorance of this district." Called St. Thomas, this seminary functioned in parallel with the Dominican institution at nearby St. Rose and both were valuable in yielding a handful of priests for Flaget. As Bishop, this arrangement served his goals until 1819 when the need for priests

[45] Having served in Kentucky since 1793, the Sulpician Father Stephen T. Badin had the familiarity to recommend to Bishop Carroll several sites for a planned new See; see his December 6, 1804 letter in Mattingly, "The Catholic Church on the Kentucky Frontier (1785-1812)," 61. Details about Bardstown found from Thomas W. Spalding, "Bardstown, Kentucky," *U.S. Catholic Historian* 18:4 (2000), 40-49, in an issue titled "Religious Geography: The Significance of Regions and the Power of Places," Dixie P. Hibbs, *Bardstown: Hospitality, History, and Bourbon* (Charleston, S.C.: Arcadia Publishing, 2002), 32-35. Flaget's geographical description appeared in his April 1815 report to Pope Pius VII reproduced in Philip Gleason, *Documentary Reports on Early American Catholicism* (New York: Arno Press, 1978), 310-319, and part of his August 11, 1811, letter to Carroll reproduced in Mattingly, "The Catholic Church on the Kentucky Frontier (1785-1812)," 210.

continued to outstrip their availability resulting in the closing of the unproductive public St. Thomas Aquinas College so its Dominican priests could remove to ministerial duties. Nevertheless, Flaget remained attentive to education and when that same year Bardstown parents, both Catholic and Protestant, requested a school, he authorized a new institution for day-scholars in the basement of St. Thomas Seminary, a school which would soon transform into a new college. Thus the prerogatives of a local Bishop stood revealed in his power to open or close educational institutions as local needs were balanced against available resources, yet holding true to the ever-present Catholic desire to educate.[46]

Patronage of this new Bardstown day-school developed at once and within a year of its opening designs for its expansion and uplift into a college materialized. The Rev. George A. M. Elder, a Kentucky-born priest ordained in Bardstown in the summer of 1819, was named president at the behest of Bishop Flaget and the new school, St. Joseph's, speedily made itself known as offering an education in "the tuition of science and general literature." While new buildings for lecturing and housing appeared in 1820 and 1823 to provide for the growing number of students, teaching science took longer to come to pass for the want of a suitable instructor. St. Joseph's might have been "destined to become highly instrumental in the diffusion of literature, science and religion," but during its early years, priorities other than science took precedence.[47]

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[46] Flaget's view of the local educational levels from his April 1815 report to Pope Pius VII reproduced in Gleason, *Documentary Reports on Early American Catholicism*, 310-319, pg. 315. A brief overview of this new Bardstown day school is found in Spalding, *Sketches of the Life, Times, and Character of the Rt. Rev. Benedict Joseph Flaget, First Bishop of Louisville*, 298-299. Between 1786 and 1850 American bishops were responsible for founding 18 out of 42 colleges; see Power, *A History of Catholic Higher Education in the United States*, 32.

[47] "Religious Establishment in the West," *Kentucky Reporter*, September 27, 1820, 1. About St. Joseph's, see Ben J. Webb, *The Centenary of Catholicity in Kentucky* (Louisville: J. C. Webb & Company, 1884), 276-281, and W. J. Howlett, "The Early Days of St. Joseph's College Bardstown, Kentucky," *Illinois Catholic Historical Review* 4:4 (1922), 372-380. A profile of Rev. Elder appears in M. J. Spalding, *Sketches of the Early Catholic Missions of Kentucky; from their commencement in 1787,to the jubilee of 1826-7* (New York: Arno Press, 1972), 278-287.

St. Joseph's gained its needed science teacher with the addition of another Kentucky-born priest, the Rev. Ignatius A. Reynolds, soon after his October 1823 ordination from St. Mary's in Baltimore. With training in physics and chemistry, Reynolds not only taught students at St. Joseph's, but he also provided instruction to the Sisters of Loretto. This synergy among Catholic institutions was facilitated by Flaget's status as Bishop, his Sulpician affiliation and that of Reynolds's east coast seminary (St. Mary's was run by the Sulpician order), and the overall improved circumstances of his Kentucky diocese. With the approval by the Kentucky General Assembly of a state charter in 1824, the college declared formally its educational intention "to instruct the students and scholars of said College, in all the liberal arts and sciences, and the ancient and modern languages" and to do so "for the benefit of every class of citizens, and of any religious denomination." Thus, within five years of opening, Catholics and non-Catholics had access to an attractive institution of higher education that offered a serviceable course of studies that explicitly incorporated science.[48]

By 1826 the college held public student examinations where Bishop Flaget or others distributed premiums and merits to pupils for their aptitude in mathematics and geography along with Latin, Greek, French, and English. Also, in that year an "appendage to St. Joseph's College" came into being as St. Thomas Seminary, which was now "open to all those who wish to receive a classical education" where, along with the "most essential branches of mathematics" and work with maps and globes, the surprisingly non-classical, but very practical, subject of land surveying would be taught. St. Joseph's soon began to award diplomas as students reached the

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[48]About Reynolds, see Webb, *The Centenary of Catholicity in Kentucky*, 312-320; also Richard H. Clarke, *Lives of the Deceased Bishops of the Catholic Church in the United States* (New York: Richard H. Clarke, 1888), 2:291-309. The St. Joseph charter was recorded in *Acts Passed at the First Session of the Thirty-Third General Assembly of the Commonwealth of Kentucky* (Frankfort: Amos Kendall and Company, 1825), 65-68.

end of their course of studies – in 1829 renowned Kentuckian Henry Clay, then American Secretary of State, attended the ceremony and handed out these formal certificates. The college's developing reputation also worked to entice students from Southern states when, for example, in 1824 and 1825 two groups of students arrived from New Orleans numbering 20 and 54, respectively, to St. Joseph's. "This college is the admiration of the Western Country," wrote Bishop Flaget to Archbishop Maréchal in 1827, and is "the source of revenue of the Diocese of Kentucky." With an enrollment of 172 students that year, the bishop could rightfully be pleased with his college and, as he noted in his letter, with "all this good" it performed for his diocese.[49]

St. Joseph's capability to teach science advanced with the acquisition of philosophical apparatus that had been donated to the college from Europe. Although this equipment aided instruction, it created a distressing tax burden on the college for which friends in Congress applied for relief as "it was not gracious to tax the donations which our brethren abroad might be disposed to make to the institutions of the new world." While an inventory of this equipment remains unknown, that a student in 1831 could collect a premium in "Mechanics, Hydrostatics, Optics, and Astronomy" suggests a broad set of natural philosophical apparatus having arrived. In addition to mentioning that the college's "library contains about 5,000 volumes," an 1834 almanac also noted "there is a good philosophical apparatus" together with a $10 annual expense "extra for the class in natural philosophy." While expensive, these pedagogical tools of science

[49] The 1826 annual examination reported in "St. Joseph's College," *Louisville Public Advisor*, August 16, 1826. The announcement about the St. Thomas 'appendage' found in "Multiple Classified Advertisements," *Louisville Public Advisor*, August 23, 1826. A short account of Clay's attendance at the St. Joseph's examination appears in "From the Frankfort Commentator," *Rhode Island American Statemen and Providence Gazette*, August 18, 1829; Clay is described as giving out a diploma to at least one student (if not all) to Alexander Etienne de Clouet who graduated with honors in 1829 as explained in "Presentation of Portraits of Prominent Sugar Planters," *The Louisiana Planter and Sugar Manufacturer* 46:20 (1911), 320-322. The arrival of students from New Orleans under the guidance of Rev. Mr. Martial is told in Howlett, "The Early Days of St. Joseph's College Bardstown, Kentucky," 373, and in Webb, *The Centenary of Catholicity in Kentucky*, 279. Transcribed copy of letter from Flaget to the American Archbishop dated 22 June 1827, MSS BA B245, folder 5 (FILSON).

would be well worth their cost in support of a complete education for students and in promoting the science-attentive curriculum to parents. While one parent did not see St. Joseph's as a "first-rate college," Edmund Rogers did consider this school as able to give his son John "a tolerable knowledge of most of the sciences," which seems the case when the college president, the Rev. Elder, rated John "perfectly" in philosophy and mathematics (including "physics, with experiments").[50]

Continued strong attendance during the 1830s supported the school's claim that "few colleges in the Western country can compete with St. Joseph's." In 1835, for example, 163 students were in attendance - 65 from Kentucky, 89 from neighboring states and D.C., and nine from Mexico and Spain – with six A.B. degrees and one A.M degree being awarded. One benefit of this long-term strength was the availability of qualified alumni who could be hired as lay teachers in the sciences and mathematics. For instance, from 1833 to 1835 St. Joseph's held on to former students John S. Cheshire and Richard Spalding to teach "natural philosophy and chemistry" and "pure and mixed mathematics" respectively, which ensured that these topics received advertised attention. Unlike science professor the Rev. Ignatius Reynolds, not all priests had the preparation and keen aptitude for teaching science and mathematics, thus it made sense to hire students like Cheshire and Spalding who, having been taught by Reynolds, could edify a further generation of students. Although this practice helped the Bardstown Diocese as it freed up scarce priests from teaching duties, it failed as a long-term solution because lay teaching did not afford a gainful livelihood for well-educated men like Cheshire and Spalding who could and

[50] A newspaper report shows Representative Charles Wickliffe of Kentucky debating this tax matter on behalf of the college on March 17, 1832; see "Legislative Acts/Legal Proceedings," *Spectator*, March 27, 1832, about a bill giving relief passing. The (non-Catholic) almanac was *The American Almanac and Repository of Useful Knowledge for the Year 1834* (Boston: Charles Bowen, 1833), 240-241. Comments about St. Joseph's from a letter to Edmund Rogers from J. R. Underwood (his nephew) dated 3 August 1829 (FILSON). John Roger's performance at the college from the January-May 1832 evaluation provided to his father Edmund (FILSON).

did seek out improved employment as seen when Cheshire departed to far western Union County to practice medicine and Spalding left to work at his family's store in nearby Lebanon. Regardless, Cheshire and Spalding proved to be a blessing to St. Joseph's, if only for two years, as their teaching service not only demonstrated the college's firm commitment to the "dissemination of learning and morality" per its 1824 charter, but also its evident desire to teach science by means of well-qualified, if non-ordained, teachers. The college had indeed become "highly instrumental in the diffusion of literature, science, and religion."[51]

St. Joseph's was not alone in offering higher education in Kentucky. Transylvania University, an institution founded in 1780 by Presbyterians in what was then Kentuckee County, Virginia, today Lexington, Kentucky, also showed itself considerate of science. In 1784 the institution received a generous donation of "philosophical apparatus as an encouragement to science" to which it added in 1805 a large electrical machine and other instructional apparatus. Described as the "Athens of the West" due in part to the reputation of its medical and law schools, Transylvania touted science on its first official seal that featured a telescope, a globe, and a book labeled Euclid. However, by the late 1820s the university found itself suffering administrative upheaval owing to a succession of presidents who struggled to implement fresh liberal ideas in an atmosphere resistant to change. Although science instruction improved during this period with a revised curriculum that imparted "a thorough education in the exact sciences,"

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[51] "A Catalogue of the Officers and Students of St. Joseph's College 1834-5," *The St. Joseph's College Minerva* 1:11, pg. 341 (quote), pg. 331 (position titles), and pg. 336 (student totals). Additional details about the college found in *The American Almanac and Repository of Useful Knowledge for the Year 1834*, 240-241. Cheshire was listed as one of Union County's physicians in Taliaferro P. Shaffner (ed.), *Kentucky State Register for the Year 1847* (Louisville: Morton & Griswold, 1847), 161; the 1850 U.S. Census shows Cheshire as a physician in Union County and the 1870 Census lists him in the same county as a "Retired Physician." Richard M. Spalding comes from the well-known Kentucky Spalding family of Catholics, several of which go on to high office in the Church; he receives a concise mention in David Francis Sweeney, *The Life of John Lancaster Spalding: First Bishop of Peoria, 1840-1916* (New York: Herder and Herder, 1965), 28-30. St. Joseph's 1824 charter found in *Acts Passed at the First Session of the Thirty-Third General Assembly of the Commonwealth of Kentucky*, 65-68, pg. 66.

enrollment declined such that by 1836 Transylvania reported 48 collegiate students compared to the 130 at St. Joseph's College."[52]

Although these Kentucky institutions proved successful, the American frontier was now moving to the south and west as Alabama, Mississippi, Louisiana, and Missouri came into the Union and parents in these new states, concerned that their sons had to endure long journeys that sometimes "occupied several weeks," issued appeals for their own local institutions. Here matters fell to the American Archbishop in Baltimore who held sway on determining dioceses and naming bishops to care for these outlying, now American, populations. With the 1815 appointment of the Rev. Louis William DuBourg, former president of Georgetown and St. Mary's in Baltimore, as bishop to the Louisiana and the Two Floridas Diocese and in 1826 his choice of the Rev. Michael Portier, a young French-born priest who had opened two schools for children in New Orleans, to head the Mobile Diocese, it was hoped that education in these historically Catholic far-off domains would be well-served if not protected from encroachment by other religions; circumstances proved otherwise.[53]

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[52] Robert Peter, et al., "Transylvania University: Its Origin, Rise, Decline, and Fall," *Filson Club Publications* 11 (1896), 18-20, 26-27. John D. Wright, Jr., *Transylvania: Tutor to the West* (Lexington: Transylvania University, 1975), 52-53, 68, 99-144. Leland A. Brown, *Early Philosophical Apparatus at Transylvania College* (Lexington: Transylvania College Press, 1959), 6. This successful call to improve science teaching came from incoming president Rev. Alva Woods; see his inaugural address in Rev. Alva Woods, "An Address delivered at the Inauguration of the President of Transylvania University, October 13th, 1828," *Transylvania Journal of Medicine and the Associate Sciences* 1 (1828), 576-591, pg. 584. Enrollment data from William C. Woodbridge (ed.), *American Annals of Education and Instruction for the year 1836*, Volume 6 (Boston: John Allen & Co., 1836), 557.

[53] In 1815 as a seven-year-old Protestant, the future Confederate President Jefferson Davis rode from his home in western Mississippi to Kentucky to attend St. Thomas College, travel that "occupied several weeks." See Varina Jefferson Davis, *Jefferson Davis: Ex-President of the Confederate States of America, Vol. 1* (New York: Belford Company, 1890), 11. These four states entered the Union in 1819, 1817, 1812, and 1821 respectively. A map of diocesan boundaries in 1822 appears in Gaustad, et al., *New Historical Atlas of Religion in America*, 312 (Figure 3.25). About DuBourg's appointment, see Melville, *Louis William DuBourg: Bishop of Louisiana and the Floridas, Bishop of Montauban, and Archbishop of Besançon, 1766-1833*, 1:337; concerning Portier, see John Gilmary Shea, *The Hierarchy of the Catholic Church in the United States* (New York: Office of Catholic Publications, 1886), 293-295.

Expansion further west and south – New Orleans and St. Louis

In 1803 when the United States acquired the Louisiana Territory from France, besides doubling the size of the American nation, all Catholic residents from New Orleans up through the greater Mississippi Valley then became subject to the jurisdiction of Bishop John Carroll in Baltimore. Carroll quickly initiated actions to establish his authority over the former French possession and paid particular attention to protecting church property in New Orleans where a sizeable Catholic population lived. However, any hope for a straightforward transition soon faded when it became known that Father Antoine de Sedilla, the Capucin who presided over the St. Louis Cathedral in New Orleans, had already written to Rome seeking to be named bishop over this new 'province.' De Sedilla's resistance to Carroll's authority would vex him and his bishopric appointees and, in consequence, impede his efforts to establish schools in this new American realm.[54]

In 1806 Carroll tested the idea of naming the French-born Rev. William DuBourg, then president of St. Mary's College in Baltimore, as the bishop of Louisiana in a letter to the American Secretary of State James Madison who replied that it was a church matter for Carroll to resolve. Reluctant to detach the indispensable DuBourg from St. Mary's until an able replacement was available, in 1812 Carroll acted with the limited powers granted him and appointed DuBourg as the Apostolic Administrator of the Louisiana Province. In a letter to the Rev. Ambrose Maréchal, who would take over as president of St. Mary's, Carroll explained that

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[54] Carroll's authority over the Louisiana Territory appeared in a 1791 Congregation of Propaganda document given in Rome that stated his rule included anyone "so long as they are subject to the government of the Republic." Found in *Records of the American Catholic Historical Society of Philadelphia* (Philadelphia: American Catholic Historical Society, 1907), Vol. 18 , 162. Details on this episode with De Sedilla given in Annabelle M. Melville, "John Carroll and Louisiana, 1803-1815," *Catholic Historical Review* 64:3 (1978), 398-440 and Peter Guilday, *The Life and Times of John Carroll: Archbishop of Baltimore, 1735-1815* (New York: The Encyclopedia Press, 1922), 700-717. About the Capucin Catholic order, see the entry "Capuchin Friars Minor" in Charles Herbermann, et al. (eds.), *The Catholic Encyclopedia* (New York: Robert Appleton Company, 1907), 3:320-327.

DuBourg "promised eminent talents . . . and [was] highly commendable for the zeal with which he exerted his talents in behalf of religion." To the challenging tasks awaiting DuBourg in New Orleans where "disorders of every kind have been introduced into it," his talents would be sorely tested.[55]

In December 1812 DuBourg arrived in New Orleans and promptly discerned that the conditions regarding de Sedilla were just as foretold, that "few indeed are more delicate and pregnant with difficulties." Given the toxic state of affairs at the St. Louis Cathedral, DuBourg established his residency at the Ursuline Convent although he did secure from de Sedilla the right to preach and officiate in the Cathedral when he wanted. "More than this I can hardly expect" wrote DuBourg to Carroll as he persevered to win over the rebellious New Orleans parish. Although he preached on a regular basis on Sundays and initiated catechism classes, DuBourg failed in capturing much local support and in July 1814, scarcely eighteen months after his arrival, he withdrew from New Orleans to his niece's residence sixty-six miles away with no advances to show for education let alone his main religious mission.[56]

Out of this setback came the seeds of an improved educational future for the Louisiana diocese. DuBourg would leave for Europe seeking recruits and donations that would help him attempt a new, stronger foothold. While in Rome, he obtained solid support from Pope Pius VII who not only promised DuBourg two Jesuit priest recruits but added to DuBourg's authority by naming him the Bishop of the Diocese of Louisiana and the Two Floridas with his official consecration taking place September 1815 in the Holy City. During this travel, DuBourg

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[55] Letter to James Madison dated November 17, 1806, in Hanley (ed.), *The John Carroll Papers: Volume 2, 1792-1806*, 534-536. Letter to Ambrose Maréchal dated February 12, 1812, in Hanley (ed.), *The John Carroll Papers: Volume 3, 1807-1815*, 175-176. Also refer to Melville, *Louis William DuBourg: Bishop of Louisiana and the Floridas, Bishop of Montauban, and Archbishop of Besançon, 1766-1833*, 1:253-258.

[56] February 1813 letter from DuBourg to Carroll, Archives of the Archdiocese of Baltimore, cited in Melville, "John Carroll and Louisiana, 1803-1815," 429.

determined that St. Louis, not New Orleans, should be the setting to "establish a seminary and primary schools" as "everything looks favorable to their happy development if they were to be in Upper Louisiana." In the summer of 1816 the first thirteen of DuBourg's recruits set off for America. They would be followed the next summer by DuBourg himself with more volunteers, including two young French seminarians, Père François Niel and Michael Portier. On January 5, 1818, after months of travel from Europe, DuBourg and his largely Sulpician retinue reached St. Louis where they enjoyed a jubilant welcome, "the point," one of DuBourg's close friends in Rome had written, "from which you will depart to reconquer the whole of your diocese."[57]

DuBourg began the reconquest of his diocese with construction of a new cathedral in St. Louis, an edifice that "cannot fail exciting a lively interest in the breasts of all those who have at heart the growth and embellishment of this infant city, but above all, its moral and religious improvement." Its cornerstone would be laid the Sunday after DuBourg celebrated his first Holy Week, a week in 1818 which also witnessed DuBourg's first ordination, that of Père François Niel. At once DuBourg assigned Niel the task of starting an academy for boys in the expanding city that "appears to have sprung into importance as if by magic," and where a newspaper reporter easily presumed the new school would belong to Catholics "under the direction of Bishop DuBourg of New Orleans." With the Rev. Niel and three advanced seminarians as instructors, the school opened in November under modest circumstances in a rented house consisting of "four wretched rooms" with tuition set at $12 per quarter payable in advance.[58]

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[57] About DuBourg's consecration as bishop, see Melville, *Louis William DuBourg: Bishop of Louisiana and the Floridas, Bishop of Montauban, and Archbishop of Besançon, 1766-1833*, 1:333-338; travel details from 1:405; quotes from 1:372-373. Note turbulent times backgrounded these events, including the War of 1812 with Britain and the imprisonment of Pope Pius VII by Napoleon from 1809 to 1814.

[58] "Untitled," *Missouri Gazette*, March 26, 1818. On Niel's ordination on Thursday, March 19, 1818, see Melville, *Louis William DuBourg: Bishop of Louisiana and the Floridas, Bishop of Montauban, and Archbishop of Besançon, 1766-1833*, 2:511. "Rapid Improvement," *Washington Review and Examiner*, July 20, 1818.

The next year found the St. Louis Academy with an added instructor "late a student of Maynooth College" who taught "practical arithmetic and bookkeeping," which suggests some call for these useful subjects. Nevertheless, as befitting DuBourg's stress on religion and morals, in September 1819 the academy advertised that it would act to "promote the moral and literary improvement of the pupils" and imbue "a due sense of religion" with assurances there would be no interference to the tenets of students holding a religious "persuasion different from their instructors." Seemingly no overt mention of science was needed to make the school attractive to parents. Indeed, a letter signed that October by all Catholic households in St. Louis granting DuBourg free use of land for his new school building confirms their strong support for his educational designs.[59]

By 1821 a college department existed in addition to the academy with both housed in a new two-story brick building where roughly 65 students learned "Greek, Latin, French, English, Spanish, and Italian languages, mathematics elementary and transcendent, drawing, etc." Reflective of the missionary zeal felt by the clergymen running the school, this emphasis given to languages points out the institution's main aims, that of teaching the dead languages to potential candidates for the ministry and offering subjects which would be attractive to the many Catholic nationalities living in St. Louis. It also sidestepped a weakness of the school's religious faculty as none could profess English as their native language. While announced as taught subjects, mathematics was imparted by a recently ordained priest and drawing came by way of a lay

[59] Mention of a new, though unnamed, instructor comes from "Classified Ads," *St. Louis Enquirer*, March 17, 1819. An advertisement under Niel's name appeared as "St. Louis Academy," *St. Louis Enquirer*, September 4, 1819. The parent's letter is quoted in John Ernest Rothensteiner, *History of the Archdiocese of St. Louis in its Various Stages of Development from A.D. 1673 to A.D. 1928* (St. Louis, Mo.: Blackwell Wielandy, 1928), 1:275-276. About the first decade of St. Louis College, consult Part 1 of William B. Faherty, S.J., *Better the Dream - Saint Louis: University & Community 1818-1968* (St. Louis: St. Louis University, 1968), 3-22.

instructor of local renown, levels of attention that cast both subjects in a low-priority light. As such, science had yet to find a place in what appeared to be essentially a religious operation.[60]

As the school year approached in fall 1823, St. Louis College remained steadfast in its affection for the sacred over the secular when its prospectus unambiguously declared "religion claims the first rank." Niel again positioned "Greek, Latin, and French languages" first in a list of subjects to be taught followed by "Belles Lettres, the use of the Globes, Geography, History, Mythology, and Mathematics," these latter subjects representing a modest expansion to the curriculum. Niel and his fellow clerics taught the languages and religious subjects while two new lay instructors, René Paul and Elihu Shepard, offered instruction on the other subjects, an apt division given the school's oft-stated religious motivations. Yet, in a nod toward an innovative system of teaching, Niel also declared "that for the public advantage, I have adopted in this college the Lancasterian system of education." Although this system with its simple emphasis on elementary reading and arithmetic stood at odds with Niel's more complete Sulpician educational tradition, let alone how it used advanced students to help teach and monitor junior students, the Lancasterian System did offer a way to attract more students, but not one that would be inherently conducive to teaching science.[61]

Mathematics now represented a strength for the college with Paul as an instructor. Although he taught on a voluntary basis, Paul brought needed teaching ability and experience as

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[60] Details about St. Louis at the time of Missouri's admission to the Union in 1821 come from "Notes on St. Louis," John A. Paxton, *St. Louis Directory and Register* (St. Louis: Printed for the Publisher, 1821). Rev. Aristide Anduzi taught mathematics while Francis Guyol taught drawing, see Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 10. Added information in John Francis McDermott, "Private Schools in St. Louis, 1809-1821," *Mid-America* 22:2 (1940), 96-119.

[61] "St. Louis College Prospectus," *St. Louis Enquirer*, May 3, 1823. About the Lancasterian System, see Carl F. Kaestle, *Pillars of the Republic: Common Schools and American Society, 1780-1860* (New York: Hill and Wang, 1983), 40-44, and Joseph Lancaster, *The Lancasterian System of Education with Improvements* (Baltimore: Wm. Ogden Niles, Printer, 1821).

reflected in his recently published textbook *Elements of Arithmetic*. In addition, he taught a separate course of mathematics at the college "consisting of the elements of arithmetic, algebra, geometry, plane and spherical trigonometry" where "frequent explanations will be given on surveying, gunnery, [and] fortifications." Shepard also had a profound impact on the college, first as the professor of languages in charge of the English department, then in his assisting in teaching Greek and Latin. Soon this Vermont-born Protestant together with another instructor, the Belgian Jesuit candidate Francois de Maillet, were given the management of the college by Niel who complained of "too much business to give that attention to the St. Louis College which it requires." Shepard would provide the college with much needed professional teaching but would offer little that could be viewed as an encouragement toward science.[62]

St. Louis education rises, falls, and rises again

Shepard and de Maillet quickly put their stamp on the college. In a prospectus from early 1824, religion fell from the first rank to be replaced by Belles Lettres, Shepard's strength, while Latin and Greek were downgraded and appeared after geography, the use of globes, and mathematics in a listing of offered subjects. For the most part, science remained neglected where, by way of comparison, "a seminary for young ladies" in St. Louis itemized astronomy, natural philosophy, chemistry, botany, and geography among its many subjects. Although Shepard claimed that the "college had as many students as could possibly be accommodated," enrollment probably stood not much higher than the 37 students who greeted him in 1823 when

[62] R. Paul, *Elements of Arithmetic* (St. Louis: Printed at the Office of the Enquirer, by Ford & Orr, 1823). An ad for this book appeared as "Elements of Arethmetic," *St. Louis Enquirer*, June 14, 1823, along with an endorsement from Niel. About Paul's mathematics course, see "Elementary," *St. Louis Enquirer*, October 25, 1823. Niel's transfer of control to Shepard and de Maillet communicated to the public in "St. Louis College," *Missouri Republican*, October 15, 1823. Shepard's teaching of Greek and Latin remembered in Elihu H. Shepard, *The Autobiography of Elihu H. Shepard: formerly professor of languages in St. Louis College* (St. Louis: George Knapp & Co., 1869), 102-3; on his teaching ability, see pg. 105.

he first arrived. Given the desire for additional students, the Rev. Niel, as parish administrator, entered into an agreement with the city of St. Louis to educate poor boys for free in exchange for a subsidy. Thus, what started out in 1818 as an institution rooted in a genuine commitment to morals and religion found itself in 1824 less a fortress in DuBourg's reconquest efforts and more a run of the mill school selling its services and science-poor curriculum to a little-interested public.[63]

The college fared worse in 1825 with a falling enrollment and staffing losses. Dr. Claude George Brun, the new president appointed by the Rev. Niel, announced that tuition would be determined "as soon as a sufficient number of students can be obtained." Jesuit seminarian de Maillet decided to cease his studies for this Catholic order and parted ways with the college in favor of work as a lay teacher in New Orleans. Shepard also found the institution's changed circumstances disagreeable and complained "several of the original professors having left the college, and their places being filled by strangers who manifested less interest in the institution than their predecessors, I determined to withdraw at the end of the year." Brun's offer of a higher salary left him unmoved as he responded that "I could make more money alone than we all could together," which Shepard did with his new school in a Baptist Church where he taught much the same curriculum as St. Louis College offered. "It was full at once" he recalled, which suggests that for many Catholic families in St. Louis, their once strong loyalty to DuBourg's endeavor had all but disappeared.[64]

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[63] "St. Louis College Prospectus," *Missouri Republican*, February 2, 1824. "A Seminary for Young Ladies will be opened by Mrs. Francis Carr," *St. Louis Enquirer*, May 24, 1824. Carr established her seminary in 1820, see Louis Houck, *A History of Missouri from the earliest Explorations and Settlements until the Admission of the State into the Union* (Chicago: R.R. Donnelley & Sons, 1908), 69. Shepard, *The Autobiography of Elihu H. Shepard: formerly professor of languages in St. Louis College*, 104 and 99. Rev. Niel's arrangement with the city of St. Louis discussed in Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 16-17.

[64] "St. Louis College," *Missouri Republican*, March 21, 1825. About de Maillet, see Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 18. Shepard, *The Autobiography of Elihu H. Shepard: formerly*

In 1826, Bishop DuBourg retreated as well by resigning his American bishopric to take up a high church position in Europe. He wrote his replacement, the Rev. Joseph Rosati, the newly appointed Bishop of St. Louis, about the college's situation: "the lay professors are quitting with pleasure" and, in what must have been bittersweet, "I believe I have at last obtained the suppression of this bad school, so ridiculously called *College*." However, this suppression set in motion a possibility DuBourg first discussed in 1823 with Father Francis Neale, Superior of the American Jesuits, of donating land in St. Louis "to help in the erection of a house for an academy as a preparation for a college" combined with a promise "to shut up the one that is now kept by some of my priests." The Jesuits expressed interest in this proposal as "the city is the principal one of the State" where "many day-scholars would attend school; of these, some would enter the Society." In 1828 when DuBourg's college at last succumbed, the way opened for a new Jesuit-run institution which "it is thought, will prove universally beneficial to society" and in its curriculum promised student minds would be "polished by the arts and sciences."[65]

In contrast to DuBourg's 'bad school', the Jesuits made an explicit promise to teach science and one likely to be fulfilled given the scope and depth of a Jesuit education. Yet DuBourg's school failed not for a want of teaching science, but for administrators more concerned about matters of religion and morals together with mediocre teachers lacking

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professor of languages in St. Louis College, 107-108. Shepard's first advertisement appeared in "Education," *Missouri Republican*, December 5, 1825.

[65] Letter from DuBourg to Rosati dated May 11, 1826, in Melville, *Louis William DuBourg: Bishop of Louisiana and the Floridas, Bishop of Montauban, and Archbishop of Besançon, 1766-1833*, 770. Regarding Rosati, Frederick John Easterly, *The life of Rt. Rev. Joseph Rosati, C.M., first bishop of St. Louis, 1789-1843* (Washington, D.C.: Catholic University of America Press, 1942). Letter from DuBourg to Francis Neale, November 27, 1823, in Rothensteiner, *History of the Archdiocese of St. Louis in its Various Stages of Development from A.D. 1673 to A.D. 1928*, 1:354-355. Jesuit comments in January 1, 1824, letter from Father Van Quickenborne to Father Dzierozynski, Jesuit Superior, from Gilbert J. Garraghan, S.J., "The Beginnings of St. Louis University," *St. Louis Catholic Historical Review* 1:2 (1919), 85-102, pg. 86. Information about the new Jesuit school given in "College at St. Louis," *Missouri Republican*, September 23, 1829, which opened on November 2 that year.

commitment to their school or their subjects. Despite the small market for science in St. Louis ranging from booksellers who offered “books in the various branches of Literature and Science” to a travelling show of “Philosophical and Mechanical Theatre” with “a variety of new experiments each evening,” this modest level of science interest did not reach into the college, or at least not until toward its end when Dr. Claude George Brun, president in 1825 and perhaps its one man of science, announced that “lectures on Natural Philosophy will be given as soon as an apparatus can be procured.” In the end it was too little too late given that religious and other aims persistently overshadowed science at DuBourg’s college. At least in Shepard’s eyes, the college produced a small cadre of graduates who enjoyed "success and usefulness in society," even if disadvantaged in science, and he thought quite highly of those "who stand as ornaments, pillars, and guides in the business transactions of St. Louis."[66]

Although this St. Louis school failed to meet DuBourg’s expectations, it was only one of several new institutions that would be founded in the effort to establish his authority over a diocese that stretched from Missouri south to Louisiana and Florida. Besides St. Louis, DuBourg saw a need for a school in New Orleans (with the still obstinate Father de Sedilla) and assigned the Rev. Michael Portier, one of his newly arrived European-born volunteers, with this task. Ordained shortly after the Rev. Niel on September 29, 1818, Portier spent several years working in the Natchez Missions at improving his command of English and serving victims of a yellow fever outbreak before coming to New Orleans in 1821. Quickly he opened a new

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[66] "Book Store & Bindery," *St. Louis Enquirer*, March 10, 1821. "Philosophical and Mechanical Theatre," *Missouri Republican*, July 12, 1824. Dr. Brun’s announcement regarding natural philosophy appeared in "St. Louis College," Missouri Republican, March 21, 1825. Shepard, *The Autobiography of Elihu H. Shepard: formerly professor of languages in St. Louis College*, 100. Although Brun’s efforts as a school administrator came to little, he retained an interest in science as seen in his filing several patents in 1830, including an “invention propre a mouvoir les Ballons volans et les bateaux,” or an invention to move flying balloons and boats, May 31, 1830, Aeronautics Collection, Missouri History Museum Archives, St. Louis.

academy and by 1822 it was reported to have an enrollment of eighty students. "My school is looked upon favorably and while giving to these youngsters the principles of science and religion," he wrote, and "it furnishes me with the means of doing other kindnesses." The success of this school and his many acts of kindness in the New Orleans area brought Portier to the attention of the Vatican which elevated him to be titular bishop of the new Vicariate for Alabama and the Floridas, a district comprising just three congregations in Mobile, St. Augustine, and Pensacola. At his consecration in St. Louis on November 5, 1826, Portier preached on "Divine Providence, particularly as seen in the establishment of the Church," an apt topic given his large new responsibilities for a region where he would be the sole Catholic clergyman. And applicable as well regarding the establishment of schools given their absence in his new vicariate.[67]

Expansion into the South - Alabama

Having been formally anointed with his new title and duties, Portier set out from St. Louis for his new territory and arrived in Mobile just before Christmas. Throughout 1827 he travelled among the main cities of his new vicariate – Mobile, St. Augustine, and Pensacola - preaching, baptizing, and keeping an eye toward a site for a future college. Mostly on foot, sometimes on horseback, he followed paths "tortueux et difficile" while showing a bent toward natural history when he wrote about the "combined perfumes of the magnolia and tulip trees."

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[67] "Les colléges comptent un assez grand nombre d'élèves cette année-ci. M. Portier en a eu quartre-vingts." From a letter dated March 30, 1822, in "Amérique: Missions de la Lousiane," *Annales de l'Association de la propagation de la foi: Nouvelles reçues des missions* 5 (1825), 35-79, pg. 67. Portier to Rosati letter dated May 10, 1822, from Oscar Hugh Lipscomb, "The Administration of Michael Portier, Vicar Apostolic of Alabama and the Floridas, 1825-1829, and first Bishop of Mobile, 1829-1859," unpublished dissertation, Catholic University of America, 1963, 56. By the 1825-26 school year, his school had 14 teachers, nine of which were lay instructors, teaching 250 pupils; from Michael Kenny, S.J., *Catholic Culture in Alabama: Centenary Story of Spring Hill College 1830-1930* (New York: The America Press, 1931), 35. On Portier's consecration and new vicariate, see "Consecration of a Catholic Bishop; from the St. Louis (Missouri) Herald, Nov. 15," *National Gazette*, December 7, 1826; Kenny, *Catholic Culture in Alabama: Centenary Story of Spring Hill College 1830-1930*, 37; the "Mobile/Diocese of Mobile" entry in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 10:410-412, which contains a lengthy footnote on Portier, and Shea, *The Hierarchy of the Catholic Church in the United States*, 293-295, which mentions his status "as the only clergyman in his vicariate."

By year end he settled on Mobile for his college (and seminary) as the city "is the most considerable in the state of Alabama and is destined for rapid growth and importance." In April 1828 Portier went to Europe to secure funds and recruit personal for his new vicariate, goals that met with good success. During these travels, the Vatican raised his vicariate to become the Diocese of Mobile with Portier as its full bishop, a step that would facilitate his work in service of Catholicism and education in Alabama. When he returned to Mobile in January 1830, he discovered considerable support for his new school as the "inhabitants are very pleased about the erection of this college; protestants themselves rejoice and offer to contribute."[68]

Such was the enthusiasm for the college that by May Portier and a staff of six seminarians began teaching an initial group of thirty students in space rented from a hotel near the college's planned location, a prominent rise seven miles west of Mobile known as Spring Hill whose elevation "will guarantee us from any fevers." Construction commenced on July 4 when Portier and several city and State representatives laid the cornerstone of the institution's first building, a day suitably rich in meaning for the nation and the new school. Portier published a prospectus for the "College of Spring Hill" in the fall which described its healthful location, promised that "no influence will be exercised upon pupils bred in the principles of other Christian denominations," and presented his planned curriculum which allocated considerable attention to science. "It is needless to mention that geography, astronomy, history, rhetoric, Belles Lettres, the elements of physics and chemistry, etc., etc., are included in this course of studies," explained Portier who also pledged that "no pains have been, nor will be, spared in the

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[68] Michael Portier, "Mission de L'Alabama et Des Florides," *Annales de l'Association de la propagation de la foi* 4:19 (1830), 71-112, pgs. 92 and 73. On Portier in Europe, see Kenny, *Catholic Culture in Alabama: Centenary Story of Spring Hill College 1830-1930*, 39-47. Letter telling of Protestant enthusiasm for the new college in Michael Portier, et al., "Mission de L'Alabama," *Annales de l'Association de la propagation de la foi* 4:24 (1831), 672-711, pg. 673. Protestant assistance in education at Spring Hill and other Catholic colleges is discussed in Andrew H. M. Stern, *Southern Crucifix, Southern Cross: Catholic-Protestant Relations in the Old South* (Tuscaloosa: University of Alabama Press, 2012), 69-108, esp. pg. 69.

scientific department, necessary to insure an education both solid and brilliant." By the school's second year in October 1831, one instructor wrote that roughly 50 students resided at the college where their studies embraced not only the languages of English, French, Spanish, Latin, and Greek, that it went without saying that mathematics and the other accessory sciences were being taught ("sans parler des mathématiques et des autres sciences accessoires").[69]

Despite the promises and mentions of teaching science by college staff, what actually came to pass in the classroom appeared less solid. At Spring Hill's first public student examination in December 1831, nearly all of the premiums awarded were for merit in Christian Doctrine and language-related subjects with a few for work in arithmetic and none in science. Given a rule stipulated in the college's prospectus that stated, "no pupil will be admitted whose age exceeds 12 years," this bias towards language study fit with the objectives of a classical curriculum of first developing a young student's ability to reason while instilling academic discipline. After several years it would then be suitable to proceed on to the higher subjects in mathematics and science. This progression happened at Spring Hill when in 1834 a premium in geometry could be earned, followed by algebra two years later, and by 1837 premiums in trigonometry and natural philosophy appeared. Science did enter the classroom at Spring Hill College, but first it served to induce parents in sending their sons to this wanted, yet still new, institution.[70]

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[69] Spring Hill's early history discussed in Kenny, *Catholic Culture in Alabama: Centenary Story of Spring Hill College 1830-1930*, 48-56. See Portier's January 31, 1831, letter in Portier, et al., "Mission de L'Alabama," pg. 695, where he mentions fevers. The College of Spring Hill prospectus appeared well outside of Mobile, for example in New Orleans in the "College of Spring Hill," *The New Orleans Bee*, November 16, 1830 advertisement (in both English and French). October details of the college in a letter dated October 7, 1831, from an instructor, Rev. John. S. Bazin, see Michael Portier, et al., "Mission des Florides," *Annales de l'Association de la propagation de la foi* 5:29 (1832), 601-640, pgs. 619-628.

[70] List of awards from: "Distribution of the Premiums at the annual public examination of Spring Hill College," *The New Orleans Bee*, December 28, 1831; "Spring Hill College," *The New Orleans Bee*, July 25, 1834; "Distribution du Prix, College de Spring Hill," *The New Orleans Bee*, November 25, 1836; and "Distribution of Premiums, Spring

The year 1837 also saw the college's first graduation where four students received their degrees in a formal ceremony sanctioned by a state charter obtained two years earlier. Not only did this charter empower the college to grant "degree or degrees in the arts and sciences," it also dictated the makeup of its board of professor to include "a professor of chemistry and natural philosophy" and "a professor of mathematics" as well as the customary professors of divinity and languages. Little is known about who held these early faculty positions; one professor of mathematics was Levi Fletcher, an 1823 Harvard mathematics graduate who submitted a thesis titled "Projection and Calculation of the Grand Solar Eclipse of February 12, 1831" and later taught mathematics at the Franklin Institute in Philadelphia. He came to Spring Hill in 1835 as a lay instructor and taught mathematics and Latin until his death in 1839, thus helping Spring Hill fulfill its charter obligation to teach these subjects. While Latin was the stronger of his two talents given that the school used his 1835 English translation of Père Lhomond's Latin grammar text, a work that he dedicated to Portier, he nonetheless described himself as a "Professor of Languages and Mathematics in Spring-Hill College," thus suggesting a serviceable balance existed between these two subjects for him and, more importantly, the college.[71]

The next ten years proved challenging for Spring Hill College as its administration changed from Portier's original company of priests, who were hard pressed by their expanding

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Hill College," *The New Orleans Bee*, November 23, 1837. Portier's 'age 12' rule appeared in the prospectus in the article "College of Spring Hill," The New Orleans Bee, November 16, 1830.

[71] Owing to the loss of records in an 1869 fire, only the names of two of the four graduates are known; see Kenny, *Catholic Culture in Alabama: Centenary Story of Spring Hill College 1830-1930*, 112. College incorporation and degree granting powers found in *Acts Passed at the Annual Session of the General Assembly of the State of Alabama* (Tuscaloosa: Meek and McGuire, 1836), 136-137. Fletcher details from Henry C. Badger, "Mathematical Theses of Junior and Senior Classes, 1782-1839," in Justin Winsor (ed.), *Bibliographical Contributions* (Cambridge, Mass.: Library of Harvard University, 1888), 111; an ad about his teaching in Philadelphia, "Franklin Institute Lecttures & Schools," *Philadelpia Inquirer*, October 12, 1830; translated Latin book: Levi Fletcher, *Elements of Latin Grammar for the use of Lyceums and Colleges, by Lhomond* (Philadelphia: Haswell & Barrington, 1835); and short obituary notice, "Died," *The North American (Philadelphia)*, November 25, 1839. Unsurprisingly as with most Catholic institutional histories, Kenny only mentions Fletcher's contribution via his Latin text and says nothing his teaching mathematics; see Kenny, *Catholic Culture in Alabama: Centenary Story of Spring Hill College 1830-1930*, 92-95.

religious duties, to the Fathers of Mercy and then the Eudist Fathers, two Catholic religious orders whose primary strengths and goals did not lend themselves to the running of a college. When the Eudists retired from running the school in 1845 having not lasted even a year, the Rev. Portier resumed "immediate direction" of the school and dispatched a trusted envoy to Europe in search of a new steward. As with St. Louis, the Jesuits proved keen on running this college and agreed to take over this "work already established from which the Mobile clergy and Christian parents promise themselves further advantages." Seen as "fresh auxiliaries in the field of science and religion," the Jesuits were welcomed as they took custody of Spring Hill. When the students reconvened in fall 1847 under their experienced management, they found a strengthened science curriculum of "mathematics as far as fluxions, inclusively, natural and mental philosophy, astronomy, chemistry, natural history, etc., etc.," was now offered. Despite the disappointing circumstances of this turnover, continuity in teaching science persisted to the definite betterment of Spring Hill and residents of Mobile.[72]

Conclusion

At the time of Archbishop Carroll's death in December 1815, Catholics (and Protestants) could attend three American Catholic colleges: Georgetown College in Washington, D.C., St. Mary's College in Baltimore, and St. Thomas Aquinas College in Kentucky. St. Mary's College stood out as the strongest of the three with the highest enrollment while it and Georgetown possessed charters that allowed the conferral of degrees. When it came to deliberate instruction

[72] About the Fathers of Mercy and Eudists, see Kenny, *Catholic Culture in Alabama: Centenary Story of Spring Hill College 1830-1930*, 102-111. Portier taking over the college mentioned in "We take pleasure in referring our readers," *Pensacola Gazette*, January 4, 1845. News of the Jesuits coming to Mobile reported in "Domestic Intelligence," *United States Catholic Magazine and Monthly Review* 6 (1847), 164-167, pg. 165. The new Jesuit president of Spring Hill, Rev. F. Gautrelet, S.J., wasted no time advertising their 'new' college co-named St. Joseph's; see "Prospectus of St. Joseph's College, Spring-Hill, near Mobile, Alabama," *Mississippi Free Trader*, August 25, 1847.

in science Georgetown and St. Mary's appeared the more noteworthy with instructors such as Grassi, Wallace, Chevigné, Paquiet, and Bruté. Although the founding of these institutions symbolized a major achievement for American Catholics who had to begin from ground zero with limited resources and the barest of organizational structure, in reality this progress paled against to the opening of twenty-five new colleges founded by other religious denominations during the same time period. Yet at a minimum, these initial three Catholic colleges stood as Carroll's much wanted foothold for American Catholicism and, more important to my purposes, honorably fulfilled his mandate for "communicating science" to an increasing number of students[73]

But what counted as science for these early nineteenth-century American Catholic institutions of higher learning and how best to describe its role? At first, the Jesuit-educated Carroll and others did not stray from either the Jesuit *Ratio*-based curriculum and its dictates about the teaching the natural sciences or the standard liberal arts offerings extant in the United States at the time. This left sciences like natural philosophy, astronomy, chemistry, and natural history visible, but never in the forefront of a school's curriculum, except when it came to promoting the school. Although taught at a simple level, the science taught at these schools satisfied the communities they served and pleased parents of both Catholic and non-Catholic students. Complemented by mathematics and aided by the use of globes and other instruments as best these institutions could afford, these sciences suffered a mostly functional role in support of curricula calculated to recruit students. Given that Catholics existed as a small minority in the United States comprising just 2.5% of the population in 1820 and the real caution expressed toward to their churches, that Catholic schools drew students of all faiths situated this religion

[73] See the lists of college foundings in Tewksbury, *The Founding of American Colleges and Universities before the Civil War*, 60 and 70. Quote from Carroll's printed broadside, dated 1787. GTUA.

group as a good neighbor, fostered harmony, and probably produced a few conversions, all desirable qualities which helped these schools establish a foothold and survive.[74]

Yet from this foundation steeped in convention appeared an adaptability where these new schools soon began to refashion their curricula to incorporate practical subjects like land surveying and accounting, useful arts deemed important to the young American nation. These more commercial topics continued an attractive emphasis on science and mathematics, which gained these Catholic schools added students who, in Carroll's view, were "destined for the commercial line" - in effect this decreased emphasis on a standard liberal arts curriculum gave rise to what could be called an early science-explicit curriculum that in time made possible the granting of Bachelor of Science degrees.[75]

Was science, in fact, conspicuous to the students at these Catholic schools? For fourteen-year-old James H. Couper at St. Mary's in Baltimore, the answer might have been 'no' based on a letter to his father in 1808 to complain that "I have been studying Latin since my arrival here," a protest suggesting the school taught nothing but this dead language. In reality, young students like Couper would be expected to commence their classical education with the study of Latin in addition to perhaps a little basic science like geography and elementary mathematics, then advance to more and higher science in their final years of instruction. Had Couper stayed and

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[74] In 1820 the U.S. (White) population stood at 7,866,797 with 195,00 estimated as Catholic; see Table 1 in Shaughnessy, *Has the Immigrant Kept the Faith? A study of immigration and Catholic growth in the United States, 1790-1920*, 73.

[75] "Georgetown College," National Intelligencer, and Washington Advertiser, July 27, 1804. Santa Clara College in California granted its first B.S. degree to Amsted Burnett in 1859; see next chapter for more details. Geiger pointed out this turn by Catholics toward "providing higher education appropriate for a Catholic community," but starting at a much later date in the nineteenth century (ca. 1850) and only by way of the "heavily classical course" of study, not earlier in the century nor with practical courses as I have identified; see Roger L. Geiger, "The Era of Multipurpose Colleges in American Higher Education, 1859-1890," in Roger L. Geiger (ed.), *The American College in the Nineteenth Century* (Nashville: Vanderbilt University Press, 2000).

completed a St. Mary's degree, he would have encountered constant science as taught by the college's competent professors like Louis I.M. Chevigné and Jean Baptiste Paquiet. In comparison, Couper's classmate William de St. Martin of Baltimore, who received his A.B. degree in 1816 after spending eight years at the college, gave a well-received talk at commencement "On the Advantage of Natural Philosophy and Chemistry" where he was described as revealing "a most extensive and accurate knowledge of the subject."[76]

While St. Mary's no doubt gloried over a student like de St. Martin who mastered both Latin and science, it remained cognizant of students like Couper who found Latin a barrier to science, or to admission to the school itself. Thus in 1814 the college relaxed its requirement to study the dead languages and instead allowed students to study:

> at their choice, the English, French, and Spanish languages, Geography, and the use of the Globe, Practical Arithmetic, Mathematics in all their branches, Surveying and Natural Philosophy.

Thus St. Mary's fashioned its own course toward a science-explicit curriculum where natural philosophy enjoyed specific emphasis while the college safeguarded its enrollments as future students could now opt out from having to study the dread dead languages.[77]

Over and above the awarding of premiums in science and other subjects, faculty at these early schools took the granting of degrees seriously and allotted it a definite gravity when judging student performance. For example, in 1822 the St. Mary's faculty decided to reject Frederick Pickney for a degree "both for want of proficiency & for a habitual contempt of

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[76] Couper letters dated September 4, 1808, and February 18, 1810, to his father ("Dear Papa"), STMSUA, Record Group 3, Box 12. Reading this letter suggests that criticism about St. Mary's faculty having poor skills in English grammar had some basis in reality. About Couper, records show that he never received a degree from St. Mary's. Comment about de St. Martin's July 18, 1816, oration from undated newspaper clipping, STMSUA; mentioned in Kortendick, "The History of St. Mary's College, 1799-1852," 65-68, esp. pg. 65 and 68. Text of his talk not found, thus the nature of this 'advantage' remains unknown.

[77] Unsigned newspaper notice, "St. Mary's College, Baltimore," *Charleston Courier*, August 20, 1814, 2.

sciences and classical learning in general." However, shortly thereafter the faculty reversed their decision when it became known that Pickney had recently suffered "the loss of a beloved Father" and "upon delicate considerations," it was settled that "the degree of A.B. will be conferred upon him *Servatis servandis* at the ensuing commencement." So, falling short in the sciences either through a lack of proficiency or contempt for the subject could possibly thwart conferral of a degree, a stance which gave more credibility to the Catholic higher education enterprise.[78]

Likewise, several early Catholic college faculty took science and mathematics earnestly enough to write books on these subjects which not only bestowed fitting credit on the authors and their home institutions, but it also made available a textbook with content well-tailored for Catholic (or other) institutions to use. Although lay teachers Louis Chevigné at St. Mary's in Baltimore and Rène Paul at St. Louis published useful works on mathematics in 1806 and 1823 respectively, it was the book on globes and practical astronomy by Jesuit scholastic James Wallace in 1812 that stood as the greater Catholic contribution to American education and science. Given the paucity and expense of textbooks available in the nascent American nation, which obliged students like Franklin Didier at St. Mary's to handcopy the college president's copy of the *Elements of Natural Philosophy, Confirmed by Experiments*, new works like these were especially welcomed.[79]

Thus, ample evidence exists at all levels that from the outset American Catholic higher education gave the teaching of science a significant priority. Success was hoped for, failures

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[78] Minutes for June 9 and 12, 1822, in Faculty Meeting Minutes 1819-1831, STMSUA, Record Group 3, Box 15.

[79] Chevigné, *Mathematical Manual for the Use of St. Mary's College of Baltimore; containing four parts*; Paul, *Elements of Arithmetic*; and Wallace, *A New Treatise on the Use of the Globes and Practical Astronomy; or a Comprehensive View of the System of the World*. Cajori described Wallace's book as" in advance of any other American treatise on astronomy of its day;" see Cajori, *The Teaching and History of Mathematics in the United States*, 208. More details about early American mathematical textbooks found in Peggy Aldrich Kidwell, et al., *Tools of American Mathematics Teaching, 1800-2000* (Washington, D.C.: Smithsonian Institution, 2008), 3-20.

were endured, adaptations were made, and, most importantly, students came away with an education in science within the confines of educational institutions that delicately downplayed religion in exchange for the progress of its 'foothold' schools. Key to this enterprise were the faculty who taught science and who primarily came from clerical ranks. As educators and sometimes school administrators, they understood as John Carroll realized that teaching science helped, not harmed, these Catholic schools and, at least for the time being, opened important and much needed doors for Catholicism in America. From its practical attractiveness to students in the classroom to its potent advertising value when exhibited on a commencement stage, teaching science, as I have argued, helped these young Catholic schools survive, and where Catholic schools survived Catholicism benefitted and found welcome.

Like their counterpart American denominations, Catholics valued education for its inculcationary usefulness and quickly learned that being wedded to education placed them and their colleges in a good and proper light. Not that Catholic institutions lacked for critics as when St. Mary's faculty were described as being "ignorant of the first rudiments of English grammar; and what is quite as bad, they appear to be ignorant of the first principles of science," criticism such as this meant that science, along with other subjects, would have to be taken seriously at the new schools to achieve Carroll's desired ambition. Indeed, St. Mary's president, the Rev. Paquiet, elevated education higher to that of national consequence when he told a commencement audience in 1813 on how "religion and sciences are indebted for those celebrated seminaries of learning, which rescued Europe from her state of barbarism," implying that St. Mary's and associated Catholic colleges would convey a comparable salvation for America. Yet underlying this European history lesson stood a truth that hit much closer to home, that teaching science had

already obtained salvation for Paquiet's school along with its brethren Catholic institutions. For Catholic higher education in barbarous America, teaching science meant survival.[80]

[80] Over 50 pages of letters debating the merits of St. Mary's between two unnamed writers appeared in a pamphlet entitled Strictures on the Establishment of Colleges; particularly that of St. Mary, in the precincts of Baltimore, as formerly published in the Evening Post and Telegraphe by different writers, Baltimore, 1806. From Paquiet's 1813 commencement address, STMSUA, Record Group 3, Box 12.

Map 3 – Locations of institutions mentioned in *Improving* chapter

Chapter 2: Improving

It is with great pleasure that we see the constant improvement which is taking place in the way of facilities and conveniences now afford by our Catholic Colleges, and where all offer superior advantages to the youth committed to their trust, we cannot discriminate among them.

The Catholic Standard newspaper, Philadelphia, August 14, 1869

With notable pride and scant impartiality as the "authorized journal of the diocese," *The Catholic Standard* made sure its readers knew about the nine Catholic colleges and dozen lesser schools in and proximate to the city of Philadelphia available for the education of Catholic youth. Conspicuously the *Standard* withheld indicating any favorites among this regional abundance of educational institutions. All but one of these recommended colleges had formed since the 1840s or later and their recent advent signaled that American Catholic higher education no longer concerned itself with simple survival but had transformed into a serviceable collection of institutions willing and able to satisfy the educational needs of a rapidly growing population of Catholics. These nine institutions comprised just a small fraction of the 128 Catholic schools that had been founded in the United States by 1869 where 64 had charters and 18 opened the door for female education. This chapter investigates how these schools demonstrated a purposeful pattern of "constant improvement" especially when it came to the teaching of science.[1]

[1] "Education," *The Catholic Standard*, August 14, 1869, 4. This Philadelphia newspaper launched in January 1866 and for its first year included a byline of "The Authorized Journal of the Diocese," text no longer seen in the 1869 edition quoted here, but appeared, for example, in the January 5, 1867, edition. The nine colleges mentioned (and their respective foundation dates) are: La Salle (1863), Villanova (1842), Seton Hall (1856), St. John's / Fordham (1841), Holy Cross (1843), St. Vincent's (1846), Rock Hill (1857), St. Joseph's in NY (1849), and Mt. St. Mary's (1808). According to estimates by Catholic historian John Gilmary Shea, Catholic population in the United States grew 478% from 361,000 in 1830 to 1,726,470 in 1850; see Thomas O'Gorman, *A History of the Roman Catholic Church in the United States* (New York: Christian Literature Company, 1895), 496. Institutional number are from my database on American Catholic schools.

As explained in the prior chapter, teaching science proved a pragmatic necessity for the emergent American Catholic higher education enterprise which wanted more than basic survival; it wanted to expand into something worth celebrating. Having secured a resolute foothold on the American educational landscape, Catholic higher education now stood in a strong position to benefit from a mid-century stream of immigrants, a substantial number of which were Catholics. This created a demand for higher education that swelled enrollments at existing Catholic colleges and prompted the founding of many new institutions particularly in urban cities such as New York City and Boston where Catholic colleges had long been absent. Although the South witnessed the leading edge of American Catholic education during the early nineteenth century with several thriving colleges to its credit, now in mid-century the South had become a "backwater" as the ecclesiastical spotlight of the American Catholic Church turned to the pressing educational needs of the North and West. Nonetheless these Catholic institutions, old and new, participated in what the historian Stanley Guralnick called "The Revolution of the 1820s" when science came to "play a major role in discussions about curricular reform" and with Catholic schools in particular experimenting with new "scientific, professional, or English course[s] of studies" within their offerings. Here began their embarking on what I see as a decades-long period of "constant improvement" vis-à-vis the teaching of science.[2]

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[2] Surveys of American colleges routinely included Catholic institutions; for example see *Nineteenth Annual Report of the Directors of the American Education Society, presented at the annual meeting, held in the city of Boston, May 1835* (Boston: Perkins, Marvin, & Co., 1835), Appendix, 73-78, where Georgetown, Spring Hill, St. Mary's, and other Catholic colleges were listed. Even Alexis de Tocqueville took note of Catholic higher education and recorded in his diary that "the best institutions of education in Maryland are Catholic," in George Wilson Pierson, *Tocqueville in America* (Baltimore: Johns Hopkins University Press, 1996), 499. From 1840 to 1850, the U.S. population grew from 17 to 23 million or 35%; see *The Seventh Census: Report of the Superintendent of the Census for December 1, 1852; to which is appended the Report for December 1, 1851* (Washington: Robert Armstrong, 1853), 13. The view that "the South was becoming a backwater" is concluded in Raymond H. Schmandt, "An Overview of Institutional Establishments in the Antebellum Southern Church," in Randall M. Miller, et al. (eds.), *Catholics in the Old South* (Macon: Mercer University Press, 1983), 53-76, pg. 76. Another view of a diminishing Southern Catholic church is put forward in James M. Woods, *A History of the Catholic Church in the American South, 1513-1900* (Gainesville: University Press of Florida, 2011), 260-261. "The Revolution of the 1820s" is the title of chapter 2 in Guralnick,

Ladies First

Some schools found this journey easier than others. For the *Young Ladies School of the Ursuline Convent* founded in Cleveland during the summer of 1850, its initial curriculum firmly embraced "the higher branches of mathematics," a subject traditionally found in Ursuline schools since their North American arrival in New Orleans in 1727. Incorporation followed within four years and by 1858 the institution enjoyed an enrollment of 40 students, young ladies who would hear words of praise at their annual exhibition from the Bishop of Cleveland and their examiner Dr. Nichols who found himself being "greatly pleased with their progress in mathematics, geography, history, and the various branches of a thorough education." In 1872 the school expanded to add a college for women and secured state approval to confer degrees, academic powers promptly exercised on June 25, 1872, with Miss Estelle Smith receiving Ursuline College's first Bachelor of Arts degree. Here constant improvement over two decades resulted in a degree-granting college for women derived from an obvious source of motivation: the Ursuline spirit supportive of female education. Not all institutions enjoyed this kind of expansion or found this steady pace of evolvement so easy.[3]

Science and The Ante-bellum American College, quotation from pg. 23. Power, *A History of Catholic Higher Education in the United States*, 78. Philip Gleason confirms this pattern of growth, at least for the Jesuits, see Philip Gleason, "The First Century of Jesuit Higher Education," *U.S. Catholic Historian* 25:2 (2007), 37-52, pg. 44.

[3] About the Ursulines in New Orleans, see Chapter 1, fn. 15. Mathematics mentioned in a newspaper advertisement for this new Ursuline academy published in "Notice," *Plain Dealer*, August 27, 1850, page 2. Material evidence of arithmetic instruction ca. 1832 at the New Orleans Ursuline Academy survives in a cipher book in the Prudhomme Family Papers contained in the Southern Historical Collection at the University of North Carolina at Chapel Hill; it is mentioned in Ashley K. Doar, "Cipher Books in the Southern Historical Collection," unpublished Masters paper, 2006, 33-34. For more about mathematics education see Tolley, *The Science Education of American Girls: A Historical Perspective*, 78-86. Typed copies of the Ursuline Academy's 1854 Articles of Association and 1872 Authority to Issue Diplomas and Confer Degree documents maintained in UCAC. The academy's first annual exhibition was noted in "Business Notices," *Daily Cleveland Herald*, July 15, 1854. The school having "40 pupils" stated in *The Metropolitan Catholic Almanac and Laity's Directory for the United States* (Baltimore, 1859), 98. Details of the 1858 July annual exhibition found in "Cleveland Ursuline Academy," *Catholic Telegraph and Advocate*, July 31, 1858. The school's 1872 commencement described in "The Ursuline Academy - First Commencement - Interesting Exhibition," *Cleveland Daily Plain Dealer*, June 25, 1872, 3.

American Jesuits testing the rules

Sometimes barriers existed from without that hindered the pace of constant improvement despite the successful examples of other Catholic institutions, one triumph being Georgetown University in Washington D.C. which after some early struggles started to award Bachelor degrees under its recent 1815 charter. While its visibility as "the Jesuit College in Georgetown" seemingly implied that the Jesuits were making headway in America following the restoration of their order in 1814 by Pope Pius VII, St. Louis College, the next Jesuit institution established in the United States in 1828, had to overcome some headwinds of tradition before it found its own unique way forward, primarily in following the curricular prescriptions and teaching rules indicated in the Jesuit *Ratio Studiorum* being dictated from distant Rome. Even educators as determined and experienced as the Jesuits could be stymied by policies that required time to surmount in the process of adapting to local American conditions.[4]

In 1828 the Jesuits of the Missouri mission took over DuBourg's failed St. Louis College started in this rising city on the American frontier. Its first president, the Rev. Charles Van Quickenbourne, promised not only that student minds would be "polished by the arts and sciences," but pledged this college would "give a pious, moral, and classical education gratis." Reopened in November 1829, this educational offering succeeded in filling the 50 by 40-foot three-story school with over 150 day and boarding students, no doubt enrolled by parents attracted to the school's tuition-free policy. While donations from the citizens of St. Louis made it workable for the school to open at first, continued operation proved fiscally daunting in the face of considerable demand, especially the need to pay lay instructor salaries, which left Van

[4] Georgetown designation as 'the Jesuit College" from a letter to the editor, see "Editor's Correspondence," *National Intelligencer*, November 20, 1817, 1. The Jesuit's 1814 restoration described in "The Restored Society" sub-entry in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 14:100-103.

Quickenbourne reconsidering his attitude toward the long-standing Jesuit tradition of free education. Writing to the Jesuit General in Rome in support of officially charging tuition, Pope Gregory XVI directed in a January 1833 decree that a tuition dispensation for American as well as English and Irish Jesuit schools should be granted. Besides lifting the financial clouds from over this young institution, tuition revenues would allow the school to improve its curriculum offerings, in particular teaching science with the acquisition of scientific instruments and related books. While this tuition policy reconsideration from Rome stood American Jesuit institutions in good stead, sometimes decrees from distant Europe called for holding firm to the time-honored Jesuit educational rules as spelled out in the *Ratio Studiorum*.[5]

One such policy transmitted in an 1834 letter from Johann Roothaan, the Jesuit General in Rome, to Theodore De Theux, superior of the Missouri Jesuit Mission, made clear his desire for holding to the dictates of the *Ratio*: "as far as circumstances will permit, let nothing new be introduced." Prior to Roothaan's missive the school no doubt was already conforming to the essential spirit of Jesuit educational ways within the circumstances of its American frontier location. The school's 1832 charter gave a clear as well as practical nod to "the advancement of science and learning" as did it early adverts which spoke of "arithmetic, mathematics, geography, and natural philosophy" among the subjects to be taught. What would have tested Roothaan's edict was the parallel set of curricula already in place by the time his letter reached St. Louis: a classical course of studies organized well within the guidelines of the *Ratio* and an unsanctioned mercantile, or commercial, course offered owing to strong desires of area Catholics

[5] The opening and closing of DuBourg's school discussed in chapter 1. Quickenbourne's comments appeared in the "College at St. Louis," , and "College in St. Louis, MO.," *Missouri Republican*, September 2, 1828, respectively. Specifics about the new college building and the free tuition topic see Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 25, 40-41, respectively. Jesuit tuition is explained in added detail in Appendix B, "The Principle of Gratuity in Jesuit Education," Allan P. Farrell, S.J., Ph.D., *The Jesuit Code of Liberal Education: Development and Scope of the Ratio Studiorum* (Milwaukee: Bruce Publishing Company, 1938), 436-440.

parents. Had Roothaan visited St. Louis in 1834, he would have seen firsthand how students benefitted from both curricular options.[6]

Paul Auguste Frémon du Bouffay enrolled during the college's opening year of operation and in 1834 became one of the first two students to receive A.B. degrees via the school's recent charter after displaying talents across a range of subjects. In science, he earned premiums in geography and globes in 1830, delivered a short talk at the 1831 commencement on "Utilite des Arts et des Sciences," and in 1832 received the school's first ever premium in natural philosophy. Frémon du Bouffay's studies then turned toward the spoken arts as evidenced by his winning premiums in poetry and elocution in 1832 and taking on the roles of Shylock and King Henry at the 1833 and 1834 commencements respectively. He collected no premiums his final year as presumably he had exhausted all the institution had to confer. At his July graduation ceremony, he spoke of Missouri and told the audience the "effulgent sun of civilization...has shed its placid light upon our land," and then asked "where can commerce find a more beautiful haven, or science a more welcome temple?" Unsurprisingly Frémon du Bouffay's well-developed oratory talents served him well as he entered the growing St. Louis community, reciting an original poem at the 1835 cornerstone ceremony of a new orphan asylum, securing an appointment as justice of the peace in 1841, and becoming as an attorney in the 1850s. Frémon

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[6] Roothaan's May 1834 letter to De Theux, see Gilbert J. Garraghan, *The Jesuits of the Middle United States* (New York: America Press, 1938), 3:120, fn 24. Concerning Roothaan, consult Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 13:182-183. About De Theux, see Garraghan, *The Jesuits of the Middle United States*, 1:482-487. Text of the St. Louis Charter approved on December 28, 1832, appears in *Laws of a public and general nature of the State of Missouri passed between 1824 & 1836* (Jefferson City: W. Lusk and Son, 1842), 2:298-299. An early advertisement in 1833 gave a single paragraph description of the school, see James Myres, *United States Catholic Almanac, or Laity's Directory, for the year 1833* (Baltimore: Sands & Neilson, 1833), 80; one year later over five pages of text offered a description of the institution including details about the Mercantile Department (listed first) and the Classical Department (listed second), consult the James Myres, *United States Catholic Almanac, or Laity's Directory, for the year 1834* (Baltimore: Sands & Neilson, 1834), 81-86.

du Bouffay found success with his education from St. Louis University, though not in a temple of science or haven of commerce.[7]

Although St. Louis University attracted many scores of students, not all would complete a degree like Frémon du Bouffay. Nor was this the institution's goal as the Rev. Peter Walsh, an instructor who taught English, mathematics, and geography, explained in an 1831 letter to the Jesuit General in Rome that "A.B.C. schools" should suffice because "here in Missouri . . . the inhabitants are for the most part illiterate." Yet his view did not conflict with how beneficial the school appeared to parents who wanted their sons to acquire practical skills like bookkeeping and possess respectable language knack. Thus, for recent Irish émigré James Walsh, three years of instruction from 1830 to 1833 within the confines of a mercantile curriculum proved adequate to land a clerical job with *J&E Walsh*, one of the largest merchandising firms in St. Louis. Walsh didn't need complicated mathematics or science to realize a good livelihood, only to persevere in his studies while winning premiums in bookkeeping, geography, and grammar. While this Jesuit institution did not bestow degrees or diplomas on students like Walsh, everyone concerned understood the benefit acquired from this abbreviated measure of higher education. Walsh secured a suitable position in the haven of commerce and the university obtained needed tuition revenues from teaching these many short-term students. If the introduction of this manner of

[7] Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 20, 49. Frémon du Bouffay's premiums listed in the Catalogue of St. Louis College for school years 1830-1831, 1831-1832, 1832-1833, and 1833-1834. His commencement speech published in "Address delivered at the 5th Annual Examination of the St. Louis University by P. A. Fremon du Bouffay," *Shepherd of the Valley*, August 8, 1834, 2. The Cornerstone talk mentioned in "St. Louis Orphan Asylum," *Commercial Bulletin and Missouri Literary Register*, May 18, 1835. His justice of the peace appointment reported in "County Court," *Daily Missouri Republican*, March 10, 1841, and his occupation as 'attorney' listed in *The St. Louis Directory, for the year 1854-5* (St. Louis: Chambers & Knapp, 1854), 63. With the 1832 charter came the official school name of St. Louis University.

curriculum aroused Roothaan's ire, likely the former outweighed the latter as Catholicism stood well-served in any case.[8]

Yet the small science pursuits discerned in the chosen careers of Walsh and Frémon du Bouffay in no way reflected low Jesuit interest or ability to teach this subject. Science was no stranger to the Jesuits nor was the "pragmatic advantage" of teaching science lost on these educators who would have known of the successes and failures of previous American Catholic schools vis-à-vis science. Instead, the challenge facing these St. Louis Jesuits was one of reviving DuBourg's failed school which meant, in part, acquiring teaching resources to do a proper job of it. Here the efficient and far-reaching network of the Jesuits proved advantageous in the person of Belgian-born Pierre-Jean DeSmet who, in 1821, answered the Jesuit call for missionary recruits to America.[9]

The twenty-year old recruit arrived first to Maryland and later moved to the Jesuit seminary near Florissant, Missouri, where he completed his Jesuit formation and, in 1827, received holy orders. DeSmet developed a gratifying interest in the natural history of the Missouri landscape where he collected mineral, insect, and plant specimens and, in line with longstanding Jesuit tradition, sent some of these items to his Jesuit brethren in Rome. Assigned

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[8] The school's 1833-34 Catalogue listed 180 names in its *Register of Students*, mostly local. Walsh letter to Jesuit General Roothaan dated February 15, 1831, in Garraghan, *The Jesuits of the Middle United States*, 3:132. James Walsh was not related to John or Edward Walsh of J&E Walsh, but was a fellow émigré from Tipperary, Ireland. On J&E Walsh, see J. Thomas Scharf, *History of Saint Louis City and County: From the Earliest Periods to the Present Day* (Philadelphia: Louis H. Everts & Co., 1883), 2:1162-1163, and *The St. Louis Directory for the Years 1840-1: The names of the inhabitants, their occupations, and the numbers of the places of business and dwellings* (St. Louis: C. Keemle, Book and Job Printer, 1840), 62. Walsh's premiums detailed in the Catalogue of St. Louis College for the years 1830-1831, 1831-1832, and 1832-1833.

[9] Two edited volumes cover the extensive early history of Jesuits and science: John W. O'Malley, et al. (eds.), *The Jesuits I: Cultures, Sciences, and the Arts 1540-1773* (Toronto: University of Toronto Press, 1999) and John W. O'Malley, et al. (eds.), *The Jesuits II: Cultures, Sciences, and the Arts 1540-1773* (Toronto: University of Toronto Press, 2006). Scott L. Montgomery names "Pragmatic Advantage" as the first of five advantages teaching science gave schools during the nineteenth century, see Scott L. Montgomery, *Minds for the Making: the Role of Science in American Education, 1750-1990* (New York: Guilford Press, 1994), 16-20, esp. pg. 16. An overview about DeSmet found in "DeSmet" in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 4:752-753.

to the new St. Louis College in 1830 as treasurer and instructor in English, he came to know the educational and financial deficiencies of the school. While on a prolonged break to Europe from 1833 to 1838, DeSmet acted on behalf of the institution to raise funds and, thanks to an unexpected opportunity, purchase needed scientific apparatus. "I have bought a complete physical science cabinet, including a collection of minerals, for 3,500 francs, the original price of which was more than 15,000 francs," rejoiced DeSmet in an 1834 letter to his colleagues. This cabinet included a pair of exceptional 36-inch diameter globes, both terrestrial and celestial, made by the famed seventeenth-century Dutchman Willem Janszoon Blaeu. At a time when the American-made globe market remained undeveloped, these imported globes found an easy reception at St. Louis in teaching geography, astronomy, and other elements of science. When these valued items arrived in late 1834, a grateful board of trustees and faculty stood "highly indebted to the liberality and exertions of the Rev. P.J. DeSmet for the splendid apparatus of physical and chymical instruments." While these additions expanded the institution's ability to teach science, an 1836 visitor to the university opined that "the philosophical apparatus attached to the institution is very insufficient," a discouraging assessment that suggested room for improvement remained when it came to teaching science.[10]

[10] Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 26, 47. On DeSmet collecting specimens, see E. Laveille, S.J., *The Life of Father DeSmet, S.J.* (New York: P. J. Kenedy & Sons, 1915), 45; instrument purchase quotation on pg. 66; and chapters 1-4 provide a useful, if hagiographic, overview of DeSmet's early life. Comments on the DeSmet Blaeu globes and their 'discovery' mentioned in an exhibition review by Molly Lee, "Sacred Encounters: Father De Smet and the Indians of the Rocky Mountain West," *Journal of American Folklore* 107:424 (1994), 304-306, pg. 305. Details concerning early American globes found in Deborah Jean Warner, "The Geography of Heaven and Earth: Part 1," *Rittenhouse* 2:5 (1987), 14-32. A more 'global' history of globes found in Sylvia Sumira, *Globes: 400 years of exploration, navigation, and power* (Chicago: University of Chicago Press, 2014); esp. pg. 31 on American globes. Recall that Jesuit James Wallace published a volume on the use of globes in 1812 while teaching at the New York Literary Institution, see chapter 1, fn 24. Thanks were accorded to DeSmet in the *Minutes of the St. Louis University Board of Trustees* dated September 5, 1837, MJA. Edmund Flagg, *The Far West: or, a tour beyond the mountains* (New York: Harper & Brothers, 1838), 1:142.

St. Louis College found itself revitalized under Jesuit hands and did well in a short span of years to foster student interest in science as seen with Walsh and Frémon du Bouffay, although neither pursued a career connected to science. Institutionally St. Louis bettered itself through a series of small steps that included winning permission to charge tuition, obtaining a charter that allowed it "to distinguish merit by such literary honors and rewards as [it] may judge proper", introducing a useful though unsanctioned commercial course, and acquiring much needed teaching apparatus. A well-run school could and should enjoy these kinds of outcomes and 'constant improvements.' Yet sometimes bold strides occurred given the right opportunity and St. Louis took such a step when it agreed to affix a medical department in concordance with the Jesuit Constitution which stated:

> The study of medicine and laws, being more remote from our Institute, will not be treated in the universities of the Society, or at least the Society will not undertake this teaching through its own members.

Here was nothing new vis-à-vis Roothaan so long as no Jesuit had a hand in teaching in this new department, a messy problem that an eager group of St. Louis physicians made easy to avoid.[11]

Failure of the first Catholic Medical School

In late 1836 the recently founded Medical Society of Missouri, in the "interest and prosperity of this community," reached out to St. Louis University to ask if it would "extend the privileges of her Charter to the cultivation of the science of Medicine." Such was the school's interest to add the medical arts to its curriculum that the university's board of trustees "resolved that delay upon the subject is unnecessary, the sooner the better." Promptly the Society proposed

[11] Opportunities for a careers in science remained slight in the 1830s, see A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities to 1940* (Cambridge, Mass: Belknap Press, 1957), esp. chapter 3. *Laws of a public and general nature of the State of Missouri passed between 1824 & 1836*, 299 *The Constitutions of The Society of Jesus and their Complementary Norms: A Complete English Translation of the Official Latin Texts* (Saint Louis: The Institute of Jesuit Sources, 1996), 180.

a constitution for the new medical school along with the names of candidates to staff its six faculty chairs - all of which received approval by the trustees within a month. Just as fast the university advertised this new medical department in its next annual catalogue and the local *St. Louis Directory*. Last, as if to celebrate this expansion, the school requested a "new seal with an appropriate emblem & motto engraved for the use of the board & faculty of the university."[12]

Yet for all this great enthusiasm along with advertising that spoke of "making every exertion to commence operation . . . about the usual time in the fall of 1837," no medical teaching took place that year at St. Louis University. Or for the next five years. Though the financial Panic of 1837 no doubt played a part in this delay, considerable fault could be assigned to physicians listed as professors in the new medical department who were distracted by other concerns. Professor of surgery William Beaumont, well known for his studies of digestion, still had Army obligations and a prosperous private practice in St. Louis to maintain, so while his celebrity added luster to the proposed medical department, in the end, he never taught a class. Henry King, professor of chemistry, prioritized the "internal improvement" of his home state over the teaching of medicine having "devoted most of the years of my manhood to the study of the natural sciences" such as executing an 1839 "geological reconnaissance of the country in the vicinity of the Osage River." Likewise, the school's anatomy and physiology professor Charles J. Carpenter let non-medical activities related to his duties as corresponding secretary of the St.

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[12] Instituted in 1835, the Medical Society of Missouri was incorporated in 1837; see *Charter, Constitution, By-laws, &c, of the Medical Society of Missouri* (St. Louis: Chambers & Knapp - Republican Office, 1842). School proposal letter to Rev. Mr. Verhaegen from B.B. Brown, recording secretary, Medical Society of Missouri, dated September 18, 1836, found in the Board of Trustees Meeting Minutes, St. Louis University, 1833-1857 (typed copy), St. Louis University Archives, 17-18, pg. 17. More details on the Medical Society of Missouri in *Saint Louis Medical Society Centennial Volume* (St. Louis, MO.: The Society, 1939). *Catalogue of the Officers & Students of the Saint Louis University, Missouri, August 1st, 1837* (St. Louis: Charles Keemle, Book and Job Printer, 1837), 3-4. *The St. Louis Directory for the Years 1836-7* (Saint Louis: C. Keemle, 1836), 43-44. The Board of Trustees Meeting Minutes, St. Louis University, 1833-1857 (typed copy), 18-27, pg. 21. I discuss St. Louis and two other nineteenth-century Jesuit medical schools in Freiburger, "'To Any Degree': Jesuit Medical Schools in the Nineteenth-Century United States," 220-253.

Louis Western Academy of Natural Sciences sidetrack him from teaching at the envisioned medical school. Although these capable physicians were all committed men of science, these lay instructors, however qualified, clearly lacked the same commitment to classroom teaching shown by their Jesuit counterparts. With little notice this coveted Jesuit medical school and promising avenue for teaching science passed away.[13]

While the medical school lay moribund, science flourished in the traditional St. Louis curriculum. Commencement exercises during the late 1830s and early 1840s frequently offered audiences the wonders of science through student-performed "experiments in chemistry and natural philosophy" that attested to the prominence accorded to these and other science subjects by the Jesuits. While not large, the school's collection of philosophical and chemical apparatus, natural history cabinet, and library gave a critical and useful public gloss to the institution. Coupled with careful staffing of Jesuits whenever possible to teach science and other subjects, a ready source to hand being the Jesuit Seminary in nearby Florissant, this rising institution offered much to make Roothaan proud and locally "St. Louisians [felt] a pride in the steady and onward march of this institution."[14]

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[13] From an advertisement for the "Medical Department of St. Louis University" appearing in *The St. Louis Directory for the Years 1836-7*, 44. Reginald Horsman, *Frontier Doctor: William Beaumont, America's first great medical scientist* (Columbia: University of Missouri Press, 1996), 214-218. Letter, from Henry King, St. Louis, to James H. Hughes, Jefferson City, Cole County, January 31, 1853, forwarded to Sterling Price, in *Sterling Price, 1853-1857; Office of Governor, Record Group 3.11. Missouri State Archives, Jefferson City;* 1853. On the Western Academy, see John R. Hensley, "The Academy of Science of St. Louis: 1856-1988," *Transactions of the Academy of Science of St. Louis* 33:1 (1988), 5-10, and Michael Long, "Enterprise and Exchange: The Growth of Research in Henry Shaw's St. Louis," in Eric Sandweiss (ed.), *St. Louis in the Century of Henry Shaw: A View beyond the Garden Wall* (Columbia: University of Missouri Press, 2003), 136-166, pp. 140-149. The earliest activities in science in St. Louis are well described in Mary J. Klem, "The History of Science in St. Louis," *Transactions of the Academy of Science of St. Louis* 23 (1914), 79-127.

[14] The August 2, 1837, commencement included experiments in chemistry and natural philosophy; see *Catalogue of the Officers & Students of the Saint Louis University, Missouri, August 1st, 1837* as well as the catalogues for 1842, and 1843 for their respective science presentations. While in 1839, Rev. J. Van Sweevelt, S.J., was the professor of physics and chemistry, in 1837 and 1843, for example, Jesuits in formation Mr. A. M. Pin and Mr. F.P. O'Loghlen taught these subjects respectively. All these catalogues always make a prominent mention of the school's apparatus, cabinet, and library. Florissant Seminary was located about 18 miles northwest of the St. Louis University campus. Prideful remarks about the school found in "St. Louis University," *Daily Missouri Republican*, August 21, 1841.

Transplanting European Catholic education to rural American soil

In contrast to the rising urban bustle of St. Louis, the remote solitude of western Indiana greeted the six newly arrived Sisters of Providence from Ruillé-sur-Loir, France, who landed in 1840 to establish a new academy for girls in the forests just outside of Terre Haute. With one qualified educator among them, the sisters had taken this assignment to serve and teach in America at the entreaty of their bishop knowing little of what to expect. These six sisters soon discovered that matters of science would occupy a place in their school's curriculum as well as their lives at the aptly named St. Mary-of-the-Woods school. Here nature and science became one as part of the school's initial curriculum as well as offering a means of sustaining the sister's good health and that of their Terre Haute neighbors.[15]

After a hard first Indiana winter while engaged in preparations and new construction, the sisters at length opened their academy in July 1841 having advertised an ambitious curriculum of:

> reading, writing, arithmetic, geography and history, both ancient and modern English composition, natural philosophy, chemistry, botany, mythology, biography, astronomy, rhetoric, plain and fancy needle work, bead work, tapestry and lace work.

Given that only one of the sisters possessed strong English-language skills, their ability to teach all these topics seems doubtful. Yet this extensive list of subjects indicated their evident desire to offer an American-style curriculum, one that signaled a frank ambition to teach science along with other expected elements of an education deemed suitable for young girls. That science had

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[15] Offering a wealth of details about this school, see Sister Mary Borromeo Brown, et al., *The History of the Sisters of Providence of Saint Mary-of-the-Woods* (New York: Benziger Brothers, 1949). This Indiana school was one of many women's schools started around 1840; see Mary Mariella Bowler, *A History of Catholic Colleges for Women in the United States of America* (Washington, D.C.: The Catholic University of America, 1933), 17, for her list of these schools. In giving priority to teaching science, St. Mary-of-the-Woods refutes Brewer's claim that Catholic nuns "placed little emphasis" on teaching science along with mathematics; see Eileen Mary Brewer, *Nuns and the Education of American Women, 1860-1920* (Chicago: Loyola University Press, 1987), 57.

a special standing in America became obvious to the group's superior, Mother Theodore Guérin, who learned of the American appetite for science during her September layover with the Sisters of Charity in Frederick County, Maryland. "They [the sisters] teach the various sciences scarcely known in our French schools," a claim confirmed by an 1839 portrayal of St. Joseph's Academy, the female seminary run the by Sisters which offered "natural philosophy, astronomy, chemistry" along with the expected "geography with maps and globes."[16]

Before coming to America, Sister Guérin received a *Medallion Decoration* medal for her "system and method of teaching" following a visitation by "a prefecteur of the Forty Immortals," an honor made in the name of Louis Philippe I, King of France, that cited her "masterly attainments" in the many branches of knowledge, particularly mathematics. Conjoined with her prior education in the medical arts, materia medica, and astronomy, Guérin would begin her new school already imbued with the spark of science as well as her deep Catholic faith. These were the crucial elements that would bestow an attractive aura on the new school and prove amendable to the educational needs of young American girls.[17]

Learning took place both inside and outside the classroom for students at St. Mary-of-the-Woods academy owing to the productive synthesis between their "fine new building, newly erected" and the eighty acres of land on which it resided. "As to our garden and yard, we have

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[16] "Providence of St. Mary's of the Woods: Situated in Sugar Creek tsp., Vigo co. Ind., 4 miles northwest of Terre-Haute," *Wabash Courier*, July 3, 1841. Sister Mary Theodosia Mug (ed.), *Journals and Letters of Mother Theodore Guerin, Foundress of the Sisters of Providence of Saint Mary-of-the-Woods Indiana* (Saint Mary-of-the-Woods, Indiana: Providence Press, 1937), 43. St. Joseph's description found in *The Metropolitan Catholic Almanac and Laity's Directory for the Year of our Lord 1839* (Baltimore: Fielding Lucas, Jr., 1839), 88-90.

[17] Text taken from Guérin's 1839 award based on my photograph taken of the surviving document held at the Sisters of Providence Archive, St. Mary-of-the-Woods, Indiana. The Forty Immortals are the forty current members of the Académie française. Further details about this award in *Life and Life-Work of Mother Theodore Guérin, Foundress of the Sisters of Providence at St.-Mary-of-the-Woods, Vigo County, Indiana* (New York: Benziger Brothers, 1904), 94-95. For her meritorious efforts at St. Mary-of-the-Woods and other good works, Pope Benedict XVI celebrated Mother Theodore Guérin as an American saint when she was canonized on October 15, 2006, in Rome.

all the woods," wrote Sister Guérin in her journal, where besides indispensable food crops like corn and potatoes a physic garden with a variety of medicinal plants was seeded. In the enthusiastic hands of Sister Olympiade, this pharmacy grew into a valuable resource which provided for the local Terre Haute community as well, a service that endeared the Catholic sisters and their new school to the largely Protestant population. For the school's students, this easy access to the natural world fostered an academic routine where they were allowed on Thursday afternoons to explore the school's lands, including Sister Olympiade's garden, pick flowers, and gain the good health that came with time outdoors. Botany thus stood out among the premiums awarded to students at the school's annual examinations in reinforcing the connection to the land through the study of plants for these young girls, a linkage further reinforced by the school's insignia featuring the native white violet flower with the motto "Knowledge and Virtue United."[18]

Astronomy instruction at St. Mary-of-the-Woods advanced within a few years from 'astronomy' as it was listed in the academy's initial curriculum to learning about "astronomy with the use of maps and globes." Sister Guérin taught this subject at first, then passed this

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[18] The academy's first building described in "Convent and Academy of the Sisters of Providence," *Wabash Courier*, October 16, 1841, 3. Journal entry about "woods" in Mug (ed.), *Journals and Letters of Mother Theodore Guerin, Foundress of the Sisters of Providence of Saint Mary-of-the-Woods Indiana* on page 63. See Brown, et al., *The History of the Sisters of Providence of Saint Mary-of-the-Woods*, regarding: the school's physic garden and its benefits to the religious community and beyond, 336; Guérin's medical education in France, 24; Sister Olympiade work in the garden, 56; outdoor time for students, 532; flower as the emblem given to pupils, 524, and also in the *Life and Life-Work of Mother Theodore Guérin, Foundress of the Sisters of Providence at St.-Mary-of-the-Woods, Vigo County, Indiana*, 193. Botany and other premiums given at the 1848 annual examination mentioned in "St. Mary's of the Woods," *Wabash Courier*, August 19, 1848. Concerning botany and women's education, see Tolley, *The Science Education of American Girls: A Historical Perspective*, esp. chapter 5 on "The Rise of Natural History," and Elizabeth B. Keeney, *The Botanizers: Amateur Scientists in Nineteenth-Century America* (Chapel Hill: University of North Carolina Press, 1992), esp. chapter 4 on "Children, education, and Amateur Botany," and the utility of botany for medicine, pgs. 116-119. Botany and natural history at this local level by female non-specialists, Catholic or otherwise, receives little attention in national-level histories which focus more on big-name individuals and well-known institutions and thus these works overlook contributions at the nascent level of American education, for example Philip J. Pauly, *Biologists and the Promise of American Life: From Meriwether Lewis to Alfred Kinsey* (Princeton: Princeton University Press, 2000).

assignment over to Anastasie Brown, a postulant who recently joined their religious community and had a "special predilection" for astronomy in addition to mathematics. As per custom the best students earned premiums in this subject at the annual examinations and in August 1850, for example, they left the "most favorable impression" for their "wonderful mapping upon the black board of the stars of the principal constellations." Like the land below, the omnipresent Indiana night sky became another of the school's providential assets for teaching science.[19]

These mentions of globes, maps, and blackboards underscore the weight the Sisters gave to the items needed for teaching science and of their willingness to make modest material investments in their young academy even if finances were difficult. The visibility of these educational tools, much like that of the school's annual commencement, helped St. Mary-of-the-Woods to remain competitive with other schools in the region, for instance the "Female School" which opened in neighboring Terre Haute in 1842. Additional science-related teaching items came to the school from local benefactors, especially from the Rev. Augustine Martin, a French-born priest assigned to the local diocese who gifted the academy with his mineral collection that formed the foundation for a museum in the school's parlor and with the school's original natural philosophy apparatus. This gradual accrual of teaching resources - either through nature, purchase, or donation - led to the desired result when in 1850 a commentator reported that St.

[19] The 1844 prospectus referenced in H. Tracy Schier, "History of Higher Education for Women at Saint Mary-of-the-Woods: 1840-1980," unpublished dissertation, Boston College, 1987, 58. An example in advertising; ex. see "St. Mary's of the Woods: The Sisters of Providence," *Indiana State Sentinel*, October 13, 1847. Astronomy premiums noted in "St. Mary's of the Woods," *Wabash Courier*, August 19, 1848, and "Award of Premiums at St. Mary's of the Woods, Aug. 1, 1850," *Wabash Courier*, August 1, 1850. Comments regarding student's astronomy performance appeared in "St. Mary's of the Woods," *Wabash Courier*, August 10, 1850. About Sister Anastasie Brown, see *In God's Acre: Biographical Sketches (Series One)* (Saint Mary-of-the-Woods, Indiana: Sisters of Providence, 1940), 35-66, pg. 42, and Brown, et al., *The History of the Sisters of Providence of Saint Mary-of-the-Woods*, 517.

Mary's students were "above all praise" in "the sciences of geography, botany, history, rhetoric, arithmetic, astronomy, etc."[20]

Yet these academic gains found themselves diluted through the legal language of the 1846 "Act to Incorporate the Female Seminary" approved by the Indiana governor that January. While this act allowed the sisters to take any actions "necessary for the promotion of the arts and sciences," its primary goal was to give St. Mary-of-the-Woods matter-of-fact incorporated status to ensure, among other things, "its perpetual succession." Given no explicit language about the granting of degrees stated within the act, this school in the "wild woods" would not grant its first Bachelor's degree until 1899 though it remained steadily attentive to teaching the sciences. But as the act's official title confirmed, St. Mary-of-the-Woods, the first Indiana institution of higher education for women to gain a charter, existed as both a "Female Seminary" and a budding college, a dual-purpose conceded by Sister Guérin in an 1852 letter about the "young persons who have hastened here, some to consecrate themselves to God, others to acquire useful knowledge."[21]

Cultivating knowledge in an urban setting

Convent academies such as St-Mary-of-the-Woods and the Young Ladies School in Cleveland made up just two of the 202 such schools launched by Catholics for young women

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[20] Mug (ed.), *Journals and Letters of Mother Theodore Guerin, Foundress of the Sisters of Providence of Saint Mary-of-the-Woods Indiana* recounts in early letters from Sister Guérin about the difficulties, including financial, facing the new school. References to the Fr. Martin donations and Fr. Martin on pgs. 71-72; see also Brown, et al., *The History of the Sisters of Providence of Saint Mary-of-the-Woods*, 522-23. About the new school in Terre Haute, see "Female School," *Wabash Express*, May 25, 1842. The favorable remarks about St. Mary's found in "By Telegraph for the State Sentinel," *Indiana State Sentinel*, August 15, 1850.

[21] From an act to incorporate approved January 14, 1846, and published in the *Local Laws of The State of Indiana pass at the Thirtieth Session of the General Assembly* (Indianapolis: J. P. Chapman, State Printer, 1846), 9. "Wild woods" was how the Sisters described the location of their community and school, see advertisement in *The Metropolitan Catholic Almanac and Laity's Directory for the Year of our Lord 1851* (Baltimore: Murphy & Co., 1851), 94. Quotation from Sister Guérin's 1852 letter to a friend in New Orleans appears in Brown, et al., *The History of the Sisters of Providence of Saint Mary-of-the-Woods*, 653.

during the American antebellum period. Not all aspired to give a true higher education as most of their increase came about from simply trying to overcome the dearth of educational options for girls when most early institutions "ranged from discriminatory to nonexistent." While convent schools like these in the west were "an especially troubling development for leading Protestant clergy and educators," the schools existed in all parts of the United States, including large urban cities like Baltimore where St. Joseph's Academy for Young Ladies aimed "to cultivate the seeds of virtue" in their students. Like its Indiana and Ohio peers St. Joseph's Academy incorporated in 1816 just seven years after it opened but stopped short of securing a charter to award degrees. Thus, here again occurred the predictable pause within a common pattern of development for these female schools which would take many decades to change before these academic seedlings achieved full collegiate height.[22]

Within this operational scheme St. Joseph's Academy thrived as a "dwelling place of science and religion" where natural philosophy, geography, astronomy, algebra and geometry, chemistry, and like subjects won student interest. Sometimes the means to teach these subjects involved qualified lay faculty affiliated with nearby Catholic institutions, someone like Dr. Anthony Hermange who during the late 1830s taught natural philosophy and chemistry at Mount Saint Mary's College in Emmitsburg in addition to lecturing at St. Joseph's Academy. By this arrangement the Sisters of Charity who ran St. Joseph's made their best effort to provide

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[22] By 1860 202 Catholic female academies had opened, see Bowler, *A History of Catholic Colleges for Women in the United States of America*, 18. Specifics about these early French Convent schools found in Catherine Frances, S.S.J, *The Convent School of French Origin in the United States 1727 to 1843* (Philadelphia, 1936). The want for common schools in the early national time period is examined in Kaestle, *Pillars of the Republic: Common Schools and American Society, 1780-1860*, 27. Protestant concerns about these convent schools surveyed in Mary J. Oates, "Catholic Female Academies on the Frontier," *U.S. Catholic Historian* 12:4 (1994), 121-136. A generous portrayal and short history of the mature St. Joseph's published in Myres, *United States Catholic Almanac, or Laity's Directory, for the year 1833*, 87-90; quotation on pg. 88. Also see Sister John Mary Crumlish, "The History of St. Joseph's Academy, Emmitsburg, Maryland, 1809-1902," unpublished dissertation, Catholic University of America, 1945.

science instruction when their own proficiency might prove wanting. At the school's 1847 commencement Miss Emily Parrott from Washington, D.C., earned praise not only for her prose presented in English and French, she also "received a very large number of premiums in the various departments of science." These talents would be "crowned" in lieu of receiving an official degree, so at the end of one's studies a young woman might elect to go on to serve God, or more likely to simply enjoy a better life. That either outcome could arise from under one educational roof implies a minimal, if any, fine line between those willing to immerse themselves in a religious life or a secular life; learning something about science proved applicable for both options. In contrast, a few Catholic men's colleges evolved a different pattern with their structure dividing along visible seminary/college lines.[23]

A seminary by any other name

Listed foremost in the 1839 *Metropolitan Catholic Almanac and Laity's Directory* among the sixteen dioceses of the United States, the Archdiocese of Baltimore not only took pleasure in being the first diocese established in America, but also in having the most colleges for young men with four: St. Mary's in Baltimore, Georgetown in Washington, D.C., Mount St. Mary's near Emmitsburg, and St. John's Literary Institution in Frederick City. Yet described ahead of these institutions with obvious priority came the names of the three ecclesiastical seminaries then in operation, plus one seeking funding to allow it to open. This latter school, St. Charles College, began in 1830 on donated lands sixteen miles west of Baltimore and would formally

[23] Description of St. Joseph's and details about Miss Parrott from "A visit to St. Joseph's Academy," *Daily National Intelligencer*, July 24, 1847. Curriculum elements listed in *The Metropolitan Catholic Almanac and Laity's Directory for the Year of our Lord 1839*, 89. Hermange received his M.D. from the University of Maryland in 1826, see Eugene Fauntleroy Cordell, *The Medical Annals of Maryland 1799-1899* (Baltimore: Williams & Wilkins Company, 1903), 437; his lecturing at St. Joseph's noted in Crumlish, "The History of St. Joseph's Academy, Emmitsburg, Maryland, 1809-1902," 12; his teaching at Mount Saint Mary's listed in Thomas F. O'Connor, "The Founding of Mount Saint Mary's College, 1808-1835," *Maryland Historical Magazine* 43:3 (1948), 197-209, pg. 209.

incorporate that same year even though it had no facilities for its anticipated students. Not a college as its name implied but more a preparatory seminary, St. Charles school would serve pupils "whose piety, natural endowments, and aptitude for Church ceremonies and functions, give sufficient indications of a vocation to the ecclesiastical state."[24]

In the eyes of the archbishop in Baltimore, St. Charles would stand as a beacon of protection "from the storms that continually agitate the life of man" that for young men cause "the ship-wreck of their pious inclinations." Unlike Catholic schools in the south and west previously described in Chapter 1 where teaching science proved advantageous to their survival, a new institution like St. Charles, situated in a populous urban setting within the nation's principal diocese, could devote itself to the singular ambition of preparing priests under its reverential roof. Here a benign indifference to science could exist and leave unaddressed any proclivity toward religion *and* science that might be expressed by some Catholics. Thus, in contrast to curricular improvements noticed at other Catholic colleges, including those for women, here existed palpable disinterest in teaching science at this new men's college.[25]

When St. Charles finally opened in October 1848, its prospectus listed the expected subjects in a not unexpected order: "Latin, Greek, English, French, and German languages; history, geography, mathematics, moral and natural philosophy." This curriculum would be

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[24] *The Metropolitan Catholic Almanac and Laity's Directory for the Year of our Lord 1839*, 72-77, 160. A good history about St. Charles College can be found in John J. Tierney, S.S., "St. Charles College: Foundation and Early Years," *Maryland Historical Magazine* 43:4 (1948), 294-311. Announcement of the corner-stone being laid at St. Charles College and connection with St. Mary's College appeared in "Understand: Baltimore Gazette," *National Gazette and Literary Register*, July 19, 1831. The approval for the school's incorporation from the Maryland General Assembly published in Chapter 50 of the *Laws made and passed by the General Assembly of the State of Maryland* (Annapolis: Jernigan Rogers, 1830). Student admission conditions from the college's Prospectus in "Intelligence - Domestic: Prospectus of St. Charles's College, near Ellicott's Mills, Maryland," *The United States Catholic Magazine and Month Review* 7:11 (1848), 602-603.

[25] *The Metropolitan Catholic Almanac and Laity's Directory for the Year of our Lord 1839*, 75,77.

covered over a period of six years when, upon receiving not an official degree but a simple certificate of distinction, most students would presumably continue their studies in the ecclesiastical half of St. Mary's College on the pathway to the pulpit. Founded in Baltimore in 1791 by French Sulpicians as a seminary, St. Mary's originally had found little success in attracting vocations to the church and, for the few it did attract, seeing them through to ultimate ordination, so it secured its survival by becoming a college with its door open to all students regardless of their religion. In this new configuration St. Mary's found new life, yet never lost track of its ecclesiastical beginnings, an ambition improved on when the college received Pontifical University status from the Vatican in 1822. But while St. Mary's 1805 charter made welcome "the faculties, arts, and sciences, and liberal professions," the 1830 incorporation of St. Charles brandished no such language and accordingly placed little emphasis on the teaching of science.[26]

The traditional curriculum pushes out science

Of the 17 boys who entered St. Charles in 1848, eventually six would be ordained – a welcomed outcome in contrast to the paltry production for St. Mary's from 1805 to 1828 when only 7 of 31 candidates to the priesthood became priests. Having seen this new school prove itself successful and coupled with the Order's long-held objective of providing clerical education, the Superior of the Sulpician Order in the United States, Father Lhomme, revealed in 1852 that St. Mary's would continue ecclesiastical instruction, but cease operation as a college. Furthermore, in consultation with the Jesuit Fathers in the country, it was announced that the Jesuits would open a replacement school to be called Loyola College at a new downtown

[26] *Ibid*, Prospectus of St. Charles's College, 1848. For details about St. Mary's College, see my earlier discussion in Chapter 1. St. Mary's Pontifical University status, see Vincent M. Eaton, S.S., "Sulpician Involvement in Educational Projects in the See and Province of Baltimore," *U.S. Catholic Historian* 2:2 (1982), 1-94, 16.

Baltimore location. Now with St. Charles and St. Mary's efficiently dedicated to the production of priests, instruction in science came to be diminished as experienced St. Mary's faculty, like Fr. Augustin Vérot, professor of mathematics, chemistry, and astronomy, dispersed to other locations. And within ten years natural philosophy disappeared from the list of advertised subjects at St. Charles, and by 1863 what little instruction in natural philosophy that remained at the school then transferred to St. Mary's, thus making this "petit-seminaire of St. Sulpice" fully accord with what its trustees wanted – a school "embracing all the branches preparatory to the higher ecclesiastical studies" and effectively no science.[27]

But what St. Charles did, it did well, which left the new Jesuit Loyola College and other Catholic institutions better able to attend to the earthly needs of their students who wanted to learn science as well as other pragmatic fields such as bookkeeping and surveying. While Fr. Jean B. Menu, a French-born Sulpician, "hammered Latin and Greek into minds most stubborn" over the last forty years of his life at St. Charles, Fr. James Curley at Georgetown taught astronomy to students like John C. Riley using the finest instruments available from Europe. While St. Charles teachers like the Rev. John B. Randanne and the Rev. Peter Fredet had published books on Latin grammar and history respectively, Fr. Curley published astronomical observations for the greater scientific community. While teaching science was not incompatible with Catholic seminaries, it did struggle for a place in the face of the heavy stress given to

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[27] List of those ordained from St. Charles taken from *A Complete List of the Students entered at St. Charles' College, Ellicott City, Maryland, since the opening, October 31st, 1848* (Staten Island, N.Y.: Mission of the Immaculate Virgin, 1897), 4. St. Mary's priest production numbers come from Tierney, "St. Charles College: Foundation and Early Years," 294. About St. Mary's closing as a college, see Kortendick, "The History of St. Mary's College, 1799-1852," , 123-129. An 1859 advertisement for St. Charles sans any mention of natural philosophy appeared in *The Metropolitan Catholic Almanac and Laity's Directory for the United States*, 264. Tierney on pg. 304 mentions that "by 1863 when the course of Moral and Natural Philosophy was shifted to St. Mary's Seminary." Details about Vérot given in Michael Gannon, *Rebel Bishop: Augustin Verot, Florida's Civil War Prelate* (Gainesville, FL: University Press of Florida, 1997), chapter 1.

language instruction and religious preparation, leaving the proliferating number of 'civil' Catholic colleges responsible for teaching this important subject.[28]

Catholic colleges turn to the north

In contrast to the wealth of Catholic men's colleges in the Baltimore diocese active during the late 1830s, the number of Catholic educational institutions found in dioceses to the more urban and vastly Protestant north - Philadelphia, New York, and Boston - amounted to one institution each. Philadelphia's situation was typical: St. Charles Borromeo Theological Seminary opened in 1831 and eight years later could only claim a meagre twelve students. In weak support of its 1838 state charter that drew attention to "instruction in theology, science, and literature," newly ordained priest, the Rev. James Miller, taught these dozen young students for just one year as their "Prof. of Mathematics" before being reassigned. In this same city in late 1834 the Jesuit James Keily attempted to inaugurate a college in a place described as "beautiful and romantic" with a curriculum that gave priority to the dead languages of "Hebrew, Greek, and Latin" followed by the expected science subjects such as natural philosophy, chemistry, and astronomy along with "mathematics in general." While this school had secured articles of incorporation from the state by April 1835 and placed numerous advertisements in newspapers up and down the East Coast from Washington, D.C., to Boston, the proposed school, Laurel Hill College, failed to gain any footing and quietly ceased operation that summer. Given that in 1840 the Philadelphia diocese had an estimated 120,000 Catholics, this failure to found new and

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[28] Fr. Menu discussed in Tierney, "St. Charles College: Foundation and Early Years," 306-307. He started at St. Charles in 1849 and taught until his death in 1888; obituary notice in "Deaths and Burials," *The [Baltimore] Sun*, March 12, 1888. The "minds most stubborn" quotation from Bernard C. Steiner, *History of Education in Maryland* (Washington: Government Printing Office, 1894), 168. About Curley and Astronomy at Georgetown, see Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 139-143. Books by St. Charles instructors were J. [John] Randanne, *A Comprehensive Grammar of the Latin language, for the use of St Mary's College, Baltimore* (Baltimore, 1839) and *Ancient History* and *Modern History* by Peter Fredet (many editions). Curley's observatory data in James Curley, S.J., *Annals of the Astronomical Observatory, Georgetown College, D.C., No. 1* (New York: Edward Dunigan & Brother, 1852).

support other men's colleges amidst such a multitude, even schools superficially attentive to teaching science, suggests that it was being harmed by existing and more established Catholic institutions, especially ones in and near Baltimore, that were shading out these fledgling colleges to the north.[29]

In contrast to this condition of too few Catholic colleges in the American Northeast, in the south there now existed more Catholic institutions than potential students. With new colleges such as Spring Hill College in Mobile, Alabama, and St. Louis College in Missouri available, parents in those regions no longer needed to send their sons away to Kentucky, Georgetown, or Baltimore for a Catholic education. While Georgetown and Baltimore continued to attract students at the expense of schools like Laurel Hill, Kentucky schools felt this painful pinch of enrollment decline more acutely, circumstances exasperated by the expanding number of non-Catholic colleges available to non-Catholic students. One such Kentucky Catholic institution, St. Mary's College, situated in Marion Country, Kentucky, started off in 1821 as a diocesan school that struggled with fires, financial, and staffing issues amid modest enrollments. Even after operation of the college was given over to a group of French Jesuits in 1833, a decade later one of its Jesuit professors, the Rev. Augustus Thébaud said in a letter "It is impossible to entertain any illusions on the subject: our institutions in Kentucky are languishing." This failure

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[29] Diocesan statistics for the "Catholic Church in the United States," including "Colleges for Young Men" from the *The Metropolitan Catholic Almanac and Laity's Directory for the Year of our Lord 1840* (Baltimore: Fielding Lucas, Jr., 1840), 160. Rev. James Miller was mathematics professor at St. Charles Borromeo, *The Metropolitan Catholic Almanac and Laity's Directory for the Year of our Lord 1839*, 105. St. Charles Borromeo charter dated April 13, 1838, from *The Philadelphia Theological Seminary of St. Charles Borromeo: A Record of its Foundation, Charter, and Career* (Philadelphia: Catholic Standard and Times Pub. Co., 1917), 8-9; Miller ordination noted on pg. 124. One of the earliest Laurel Hill newspaper ads was the three paragraph announcement "We learn that the beautiful and romantic place, well known by the appellation of Laurel Hill," *Daily National Intelligencer*, November 12, 1834. Dozens of ads followed with curriculum and other details, one example was "Laurel Hill College," *National Gazette*, December 30, 1834. Laurel Hill Articles of Incorporation reproduced in *The Philadelphia Theological Seminary of St. Charles Borromeo: A Record of its Foundation, Charter, and Career*, 10-13. A two-page synopsis about Laurel Hill published in V. M., "Early Catholic Secondary Education in Philadelphia," *Records of the American Catholic Historical Society* 59: 3 (1948), 157-189, pgs. 172-3. Catholic population of the Philadelphia diocese given in O'Gorman, *A History of the Roman Catholic Church in the United States*, 355.

to flourish, let alone expand, was known even overseas by the Jesuit Provincial of France, Fr. Clement Boulanger, who had been tasked by the Jesuit General to visit Kentucky in 1845 to solve these many outstanding problems. He concluded that regarding St. Mary's and the state in general "Kentucky has not and cannot have a future" and made the decision that for the Jesuits "there is no hope of extension to the South" in running this 'backwater' school.[30]

The Jesuits return to New York City

This gloomy assessment made clear that extension of Catholic education lay somewhere to the west or north. When Fr. Boulanger departed Kentucky in late 1845, his journey took him north to New York City where he encountered that city's bishop, Fr. John Hughes, an able administrator well-experienced with educational matters when it concerned American Catholics. Hughes governed a small group of secular priests at the newly opened College of St. John while Boulanger oversaw an able though underutilized Jesuit faculty assigned to an ailing Kentucky college. Whether a simple matter of expediency or a thoughtful decision that obeyed "the counsel of St. Ignatius to place colleges in the cities," these two signed an agreement dated November 24, 1845, that put St. John's College of Fordham into Jesuit hands. Although Boulanger never visited the college at Fordham prior to making this arrangement, his letter to the Jesuit General in Rome written the next day explained confidently that his decision "secured for the Society, and the vast field opened to its zeal; there are more than a hundred thousand

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[30] Though struggling to teach science during the 1830s, one such non-Catholic option was Transylvania University in Lexington which I discussed in chapter 1. St. Mary's pre-Jesuit history discussed in Spalding, *Sketches of the Early Catholic Missions of Kentucky; from their commencement in 1787,to the jubilee of 1826-7*, 271-275; its early Jesuit history given in Walter H. Hill, "Some Reminiscences of St. Mary's College, Kentucky, especially during the time it was in the hands of the Jesuit Fathers, or from 1833 to 1846," *Woodstock Letters* 20 (1891), 25-38, Cornelius Michael Buckley, S.J., "French Jesuits at St. Mary's College, Marion County, Kentucky 1831-1846," in Thomas C. Hennessy, S.J. (ed.), *Fordham: The Early Years* (New York: Fordham University Press, 1998), and Gilbert J. Garraghan, "Fordham's Jesuit Beginnings," *Thought* 16:60 (1941), 17-39. Thébaud's appraisal appears in a letter dated Oct. 22, 1843 and Boulanger's comments in a letter dated Oct. 11, 1843, both addressed to the Jesuit General Jan Roothaan in Rome, documents held in the Jesuit General Archive, Rome, and quotation in Garraghan, "Fordham's Jesuit Beginnings," 31.

Catholics in the single city of New York." Thus, for this large Catholic population would come a transplanted Jesuit faculty earnestly interested in teaching the Jesuit liberal arts curriculum and particularly the sciences.[31]

In the thirteen years running St. Mary's College prior to their 1846 move from Kentucky to New York, the Jesuits had done much to improve on this small diocesan school though the Rev. Augustus Thébaud later wrote that even then it "could scarcely be called a grammar school." Thébaud, who came to the school in 1839, taught chemistry, geology, botany, and other natural sciences and was remembered by a former pupil for teaching "the higher mathematics, chemistry, and physics with method and marked success." Given these abilities, he was chosen to be president/rector prior to the relocation north to New York with "12 priests, 11 brothers, and 5 scholastics" along with the St. Mary's library, philosophical apparatus, and mineral collections. While St. Mary's continued to function with staffing provided by local diocesan

[31] An overview of the events leading to this agreement found in Francis X. Curran, S.J., *The Return of the Jesuits* (Chicago: Loyola University Press, 1966), 98-101. Details on this Hughes/Boulanger agreement and Boulanger's report to Jan Roothaan dated Nov. 25, 1845, held in the Jesuit General Archive, Rome, and quoted in Garraghan, "Fordham's Jesuit Beginnings," 32-39. Not mentioned in their agreement were comments or obligations regarding the Sisters of St. Joseph's, Emmitsburg, Maryland, who in 1844 "went to take charge of the domestic department at St. John's College, Fordham." See Mary M. Meline, et al., *The Story of the Mountain: Mount St. Mary's College and Seminary, Emmitsburg, Maryland* (Emmitsburg: The Weekly Chronicle, 1911), 1:438. That Jesuits favored urban settings is asserted in Frederick Rudolph, *The American College and University: A History* (New York: Alfred A. Knopf, 1962), 94. This cliché is undermined when St. Mary's in Kentucky along with the other rural American Catholic colleges established in the nineteenth century is considered; about this Ignatian fondness see "Jesuit Rome and Italy," in Paul V. Murphy, "Jesuit Rome and Italy," in Thomas Worcester, S.J. (ed.), *The Cambridge Companion to the Jesuits* (Cambridge: Cambridge University Press, 2008), 71-87, and Thomas M. Lucas, S.J., *Landmarking: City, Church & Jesuit Urban Strategy* (Chicago: Loyola Press, 1997). The life of Rev. John Hughes portrayed in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 7:516-518; Fr. Clément Boulanger described in the, *Dictionary of Canadian Biography* (Toronto: University of Toronto Press, 1976), 9:67-68. One explicatory note: the *College of St. Johns* located at Fordham, New York, renamed itself to *Fordham University* in 1907 when its new higher 'university' status was claimed. This more twentieth-century moment discussed in Thomas J. Shelley, *Fordham, A History of the Jesuit University of New York: 1841-2003* (New York: Fordham University Press, 2016), 178-200.

priest, St. John's College, now energized with experienced and science-inclined academic instructors, quickly began to exhibit signs of elevated academic performance.[32]

Prior to the Jesuits taking over in the autumn 1846, St. John's had shown little outward sign of teaching science, a situation no doubt due to its youthful status where few if any of its students stood ready to receive instruction in natural philosophy, chemistry, or other advanced subjects. The school's commencement exercises reinforced this impression as they appeared little more than events that allowed students to offer "speeches, poems, and other original pieces in Latin, Greek, French, Spanish, and other languages" and naught on matters of science. Certainly, this character matched the priorities of the school's main architect, the Rt. Rev. John Hughes, now Bishop of New York, who wanted to ensure that New York Catholic education appeared in the best possible light following his recent clash with the New York City public school trustees. A sense of his priority for religion stood out clearly at the 1845 commencement when he declared "the absolute necessity of connecting strictly religious with secular instruction to the formation of a perfect educational system." The college's transition into Jesuit hands would

[32]Thébaud documented his time in the United States with many details about St. Mary's and St. John's colleges in a set of volume; his comment on St. Mary's from Charles George Herbermann (ed.), *Forty Years in the United States of America (1839-1885)* (New York: United States Catholic Historical Society, 1904), 346-347. This volume also listed the subjects he taught (p. 11) as did the *Third Annual Commencement of St. Mary's College, Marion County, Kentucky 1839-9* (Louisville: Morton & Griswold, 1839) where he was cited as "Professor of Geology, Minerology, and Botany." Former student Walter Hill, who received his A.B. degree at the Seventh Annual Commencement of St. Mary's, College on July 19, 1843, offered many memories about Thébaud in Hill, "Some Reminiscences of St. Mary's College, Kentucky, especially during the time it was in the hands of the Jesuit Fathers, or from 1833 to 1846," 35. Thébaud's botanical and mineralogical talents displayed in a letter dated Oct. 15, 1843, to one of his superiors concerning his "excursion of nearly seventeen hundred miles upon the Mississippi and its tributaries," reproduced in A. J. Thébaud, S.J., "Missions of North America," *Annals of the Propagation of the Faith* 7 (1844), 379-402. With many details about this new Jesuit mission in New York, including this count of the arriving Jesuits from Kentucky, see Curran, *The Return of the Jesuits*, 98-107, pg. 102. St. Mary's continued operation no doubt aided by "An ACT to incorporate St. Mary's College" published in *Act of the General Assembly of the Commonwealth of Kentucky, December Session 1836* (Frankfort: A.G. Hodges-State Printer, 1837), 54-56. Notice of St. Mary's College being under new charges appears in its listing in *The Metropolitan Catholic Almanac and Laity's Directory for the Year 1847* (Baltimore, 1847), 128; regrets of the local population and bishop touched on in Robert I. Gannon, S.J., *Up to the Present: The Story of Fordham* (Garden City: Doubleday & Company, 1967), 34-35.

moderate this tough stance with their ability to include room for the teaching of the sciences while remaining suitably attentive to religion, no doubt an improvement to all concerned.[33]

Without delay Fr. Thébaud reformed the school's curriculum away from "the model of that of Emmitsburg," i.e., Mount St. Mary's College where Bishop Hughes had gone to school in the 1820s, and made it conform to the curriculum then being offered by the Jesuits at Georgetown, who acceded to Jesuit *Ratio Studiorum* dictates. Thébaud also ended the option for students at St. John's to pursue "a partial course fitting them for commercial or other pursuits," a program of study he considered "an ugly feature of our institutions." In comparison, science instruction attained new prominence as both natural philosophy and chemistry were taught "one hour, five times a week, throughout the year" coupled with demonstrations and experiments. Within a few years these steps had paid off when a local newspaper referred to St. John's as "this celebrated academy of science and classic lore" in its report on a May 1849 public science demonstration of chemistry performed by four students. One student, David A. Merrick, who would graduate the following year, dubbed chemistry "a science which was simple and within the reach of all." Thébaud must have been doubly satisfied with Merrick not only for the pleasurable way he put his education and the school on display, but that he later decided on becoming a Jesuit.[34]

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[33] Commencement description reported in "Commencement of St. John's College, Fordham, Westchester County, New York, July 13," *The New York Herald*, July 14, 1843. Bishop Hughes' comment made at the July 15, 1845, commencement and appeared in "Commencement of St. John's College," *Albany Journal*, July 21,1845. About Bishop John Hughes, consult Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 7:516-518. His conflict with the Public School Society in New York is described in Diane Ravitch, *The Great School Wars: a history of the New York City public schools* (New York: Basic Books, 1988), chapters 3 and 4, also in Kaestle, *Pillars of the Republic: Common Schools and American Society, 1780-1860*, 166-170.

[34] Thébaud spoke of St. John's 'Emmitsburg' curricular model and disdain regarding the commercial course in Herbermann (ed.), *Forty Years in the United States of America (1839-1885)*on pages 340 and 350 respectively. That Georgetown's curriculum was adopted at St. John's and degrees being awarded to existing students comes from Curran, *The Return of the Jesuits*, 104. St. John's listed this commercial course option in its annual report dated July 15, 1846, as published in the *Annual Report of the Regents of the University of the State of New York* (Albany: C. Van Benthuysen and Co., 1847), 56-58 while still a diocesan school; this option no longer appeared when the Jesuits

When the Jesuits assumed control of St. John's College in 1846, they released nearly all of the lay instructors in favor of their own, including the mathematics and natural sciences teachers. First to be let go was John Ryan, professor of mathematics who had taught at St. John's for three years, replaced by Fr. Michael Driscol, S.J., who assumed responsibility for instruction in mathematics and Latin that first year of Jesuit operation where his background likely gave him more expertise in the latter compared to the former. That Ryan himself advertised for a new position in the local newspaper suggests his dismissal caught him by surprise even though the coming Jesuit takeover would have been common knowledge at the time. Seemingly he found temporary employment as a teacher of mathematics for members of the Mercantile Library Association in New York based on an October 1846 newspaper advertisement where Ryan's recent employer, the President of St. John's, testified to his "high character," which implies his release from the college didn't involve any negative reasons. In contrast, John B. Stallo, who in the fall of 1843 had become the school's professor of natural philosophy and chemistry, retained his position for the first year of the Jesuit transition, perhaps to help facilitate the arrival of the scientific apparatus shipped from Kentucky. Although a man of many talents and having taught the sciences and mathematics for four years at Xavier College in Cincinnati, another Jesuit college founded in 1831, he too was released in favor of a pair Jesuit instructors who handled these subjects over the next few years. So, while science and mathematics received appropriate attention at St. John's with the cost savings of using Jesuit instructors who "receive[d] no

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took over the following year. Time given to teaching science and other subjects provided in the 1847 annual report published in *Annual Report of the Regents of the University of the State of New York* (Albany: Charles van Benthuysen, Public Printer, 1848), 52-60, pgs. 54-55. Quotation about St. John's and by Merrick from "The Chemical Entertainment at St. John's College at Fordham," *The New York Herald*, May 24, 1849. Merrick having graduated in 1850 and becoming a Jesuit described in "Death of Father Merrick; A prominent New York Jesuit passes away in this city," *New York Times*, April 22, 1906.

salary," the departure of an experienced staff represented a missed opportunity for St. John's to grow and improve outside of Jesuit, but within American, norms.[35]

With the Jesuits now in charge a small stream of graduates numbering from four to eight students began receiving their A.B. degrees from St. John's College each year, though in comparison these numbers were roughly one quarter of the Arts degrees awarded by neighboring Columbia College. Despite this success, growing pains during these early years were evident in teaching science and in adjusting the traditional Jesuit curriculum to the demands present in this new urban location. A shortage of "a set of instruments for the experiments on the polarization of light, which owing to financial difficulties, could not yet be procured," hindered science instruction, a difficulty sorted out the following year. And given that not all potential St. John's students set their aspirations on becoming a cleric like David Merrick, the school reversed its initial position and decided to offer a commercial course starting in 1849 so that "when it is the wish of parents or children, that their sons or wards should be fitted for commercial pursuits, care is taken to direct and adapt their studies accordingly." Notably, this commercial course placed an emphasis on science such that the better students in the course could garner premiums in natural philosophy the same as students studying in the classical degree course. Hence, for New York City with its 100,000 Catholic residents, this "celebrated academy" found success as a

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[35] Details on Driscol, see Thomas C. Hennessy, S.J., "The First Jesuits at St. John's College (Fordham), 1846," in Thomas C. Hennessy, S.J. (ed.), *Fordham: The Early Years* (New York: Fordham University Press, 1998), 94-96. Ryan's advertisement appeared in the "General Notices," *New York Daily Tribune*, August 19, 1846. His hiring at the Mercantile Library Association showed up in the advertisement "Mercantile Library Association Classes 1846 and 1847," *Evening Post (New York)*, October 24, 1846. Good details about Stallo come from "Sketch of John B. Stallo," *Popular Science Monthly* 34 (1889), 548-555. When he departed Xavier, the college awarded him an A.M. degree, see *The Calendar of the St. Xavier College, Cincinnati, Ohio, for the Academic Year 1843-44* (Cincinnati: Daily Commercial Print, 1844), 14. Stallo would go on to write J.B. Stallo, *The Concepts and Theories of Modern Physics* (New York: D. Appleton and Company, 1882), a volume examined in Albert E. Moyer, *American Physics in Transition: A History of Conceptual Change in the Late Twentieth Century* (Los Angeles: Tomash Publishers, 1983). Little is known regarding the two Jesuits who taught science and mathematics at St. John's, Fr. Arsenius Haveques and Fr. Julius Pottgeisser. That the Jesuits at St. John's were not paid followed a customary Jesuit policy, a detail noted in *Annual Report of the Regents of the University of the State of New York* dated July 1847, 53.

welcoming home with improved educational opportunities for the diverse teaching of science to its students.[36]

Female education in New York City and Boston

While the Jesuits had twice gone into New York City to conduct schools, the first being the failed effort with the New York Literary Institute which was closed by Archbishop Carroll in 1814 and next the more successful renewal of St. John's College, they were not the only group of Catholic educators active in the city. In 1812 a small group of Irish Ursuline Sisters arrived in New York City to open an academy "to afford to young ladies the pleasing and highly important advantages of a polite and virtuous education." What they offered included a thin veneer of science, mainly "geography and the use of globes," over a curriculum aimed at girls aged 7 to 14 which included routine female subjects like "every species of plain and variegated needlework." Incorporated in 1814 as the "Ursuline Convent of the City of New York," the school showed itself more convent than academy when, after several years of having failed to recruit any novices into their religious community, the Sisters closed the institution and departed for home. Pious religious intent proved no guarantee of success at a time when education for girls, Catholic or otherwise, remained rare.[37]

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[36] For the years 1846 to 1849, St. John's awarded 6, 4, 8, and 8 A.B. degrees respectively while Columbia granted 24, 28. 25, and 32 Arts degrees; this data found in the *Catalogue of St. John's College, Fordham, New York City 1898-99* (New York: The Meany Printing Company, 1899), 92, and the *Catalogue of the Officers and Students of Columbia College with the Graduates since 1844* (New York: R. C. Root & Anthony, 1851), 8-11. The apparatus deficiency noted in *Annual Report of the Regents of the University of the State of New York* dated July 1847, 58. The revived commercial course explained in *A Catalogue of Officers and Students St. John's College, Fordham, New York 1849-50* (New York, 1850), 23. That the commercial course students received natural philosophy premiums, along with awards for practical subjects like bookkeeping, found in *A Catalogue of Officers and Students St. John's College, Fordham, New York 1854-55* (New York, 1855), 21-24.

[37] Carroll closed the New York Literary Institution due to staffing limitations; details in chapter 1. Brief histories regarding these Ursulines coming to and leaving New York City appear in Herbermann, et al. (eds.), *The Catholic Encyclopedia*under "New York, Archdiocese of," 11:20-29, pg. 26, and in Rev. J. R. Bayley, *A Brief Sketch of the Early History of the Catholic Church on the Island of New York* (New York: The Catholic Publication Society, 1870), 82-83. An early advertisement providing curricular details about the school found in a Boston newspaper, "Ursuline Convent," *Columbian Centinel*, October 21, 1812. The school's act of incorporation passed March 25,

Even though New York City counted about 14,000 Catholics in 1808 when the see of New York was formed, or about 15 percent of the city's population, they still struggled to conduct Catholic schools for either female or male students during the bishopric's first decade. No matter that the city enjoyed a sizeable concentration of Catholics, a scarcity of priests and other hurdles created problems unique in comparison to what rural Kentucky had to contend. Two decades later to the north in Boston where 10,000 Catholics now resided, another troupe of hopeful Ursuline Sisters opened a female seminary where they too encountered some of the same obstacles. Announced in 1828, the Ursuline Community at Mount Benedict, Charlestown, forcefully declared that "the first and leading object with the ladies who have the charge of instruction, is to impress upon the minds of their pupils the importance of the great and sublime truths of religion," a heavy-handed priority on religion that would later have a part in unfortunate troubles for the school.[38]

Mount Benedict's initial curriculum listed languages first in the school's "objects of instruction" with Latin itemized curiously second behind English, a priority granted to a dead language more expected in male Catholic institutions. A modicum of science showed up as "geography, the use of the globes, astronomy" appeared among these objects, yet despite the institution's location on a twelve-acre farm with two acres of a "beautifully laid out" garden, natural history seemed to be overlooked as a formal subject. At the end of their 1828 announcement came the notice that "the religious opinions of the children are not interfered with,"

1814, and was published in *Laws of the State of New York passed at the Thirty-seventh Session of the Legislature* (Albany: H.C. Southwick, 1814), 66-67.

[38] Catholic population in New York City details from Richard Panchyk, *Catholic New York City* (Charlestown SC: Arcadia Publishing, 2009), 9, where the author notes that in 1822 New York City had only eight priests for 20,000 Catholics. Boston Catholic population information from Albert L. Bartlett, "The Transformation of New England," *The Forum* 7 (1888), 634-644, pg. 637. Newspaper announcement of the school noted in "Ursuline Convent," *Boston Traveler*, February 22, 1828.

a disclaimer suggesting that the Sister's intentions slanted toward things academic, that in contrast to the failed Ursuline convent in New York City, this Boston institution meant to serve as a school, not as a convent. Within two years, the school's 1830 prospectus described a new "Senior Department" where, among other subjects, natural history, botany, natural philosophy, and chemistry emerged as science-oriented topics of instruction. No doubt the Sisters could impart only limited teaching on these subjects, but given their prospectus asserting "they spare no pains to adorn their minds with useful knowledge," this broad curriculum proved attractive enough such that sixty-four young girls had been enrolled by their parents, most of whom were "daughters of prominent Protestant families."[39]

By the 1830s Boston's public primary schools were providing a free education to children from diverse social, economic, and ethnic backgrounds, although the unevenness of these institutions "failed to attract the affluent" which kept about a third of Boston's children enrolled in fee-based private schools. Newspapers were flush with advertisements from these schools as they winked in and out of existence, schools like the one a Miss Julia A. Perry proposed to open in 1829 that among expected subjects for young ladies included teaching in "astronomy, arithmetic, elements of chemistry, botany, [and] use of globes." Though twenty-one-year-old Miss Perry could claim some skill in embroidery having won a $1 prize in 1825 for "an elegantly wrought lace veil," she probably would have been hard pressed to teach these advertised science subjects to her students. Furthermore, Boston's School Committee at this time approved instruction in advanced subjects at grammar schools for young girls when their

[39] Mount Benedict's 1828 offerings detailed in "Ursuline Community, Mount Benedict, Charlestown," *United States Catholic Miscellany* 7:37 (1828), 296. The 1830 prospectus found at Boston College, Special Collections, "Ursuline Community, Mount Benedict - Charlestown," prospectus, 1830, Ursuline Academy materials Box 1, folder 23. Mt. Benedict's 1830 enrollment and pronounced Protestant makeup described in Nancy Lusignan Schultz, *Fire & Roses: The Burning of the Charlestown Convent, 1834* (New York: The Free Press, 2000), 68.

numbers warranted, a clear signal that any Boston school needed to be attentive to quality instruction across a variety of subjects, including science, to remain viable in this competitive educational arena. It was within this dual public/private space that the Ursulines running Mount Benedict found a pleasing measure of success with an attractive curriculum along with having a certain institutional stability, yet into this moment the unexpected complexity of a long-simmering anti-Catholic mood appeared.[40]

In mid-1832 a Catholic periodical "unhesitatingly pronounce[d] this flourishing institution as a blessing to Massachusetts and a credit to Christianity" and remarked on the children's talents in prose, poetry, song, music, and drawing while saying nothing with reference to science. Not all subscribed to this view of the school or with the many associated Catholic immigrants who had settled in the Boston area, including Calvinist minister Lyman Beecher who in early 1831 gave two lectures denouncing Catholics and Romanism only to be quickly answered with lectures by Boston Bishop the Rt. Rev. Benedict Fenwick. The situation simmered bit by bit until bursting into flames on the night of August 11, 1834, when a mob burned down the entire school with the 60 or so students and sisters escaping with only the clothes on their backs. Although a horrendous loss for Boston Catholics, science seemed to have suffered little harm as nowhere was it or any science teaching tools such as globes mentioned among the damages of the conflagration.[41]

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[40] Boston schools receive good attention in Kaestle, *Pillars of the Republic: Common Schools and American Society, 1780-1860* with helpful details about primary schools found on pg. 58. Perry advertisement in "Instruction," *Boston Recorder*, April 30, 1829 and her $1 prize was listed in "Agricultural," *Old Colony Memorial*, December 10, 1825. Boston School Committee decision described in William J. Reese, *The Origins of the American High School* (New Haven: Yale University Press, 1995), 154. The prelude to anti-Catholicism in Boston discussed in Thomas S. Kidd, "'Let Hell and Rome Do Their Worst': World News, Anti-Catholicism, and International Protestantism in Early Eighteenth-Century Boston," *The New England Quarterly* 76:2 (2003), 265-290.

[41] "Ursuline Academy at Charlestown," *United States Catholic Intelligencer*, June 1, 1832, 287-8. Beecher lectures reported in "Dr. Beecher's Lectures on Catholicism," *Hampshire Gazette*, January 19, 1831, while a short report on Rev. Fenwick's lecture appeared in "Bishop Fenwick's Lecture," *National Gazette and Literary Register*, January

In 1838 the school attempted to reopen in a rented space in Boston, but parental fears regarding the wellbeing of their daughters and the Financial Panic of 1837 combined to deter enrollments. By 1843 the Superior of this Boston Ursuline community, a company in decline due to internal bickering, signed over what properties remained to Bishop Fenwick and closed for good, not to reopen for nearly a century. Compounding the difficulty of restarting the school came from the 1835 publication of the book *Six Months in a Convent* by Rebecca Theresa Reed that presented dark claims about her being held as "an inmate of the Ursuline Convent." Reed wrote that once she earned the displeasure of the convent's Superior with her singing of the "Ode on Science," a favorite song "which every one knows" that she selected at the request of the bishop during one of his many visits. "I perceived she was evidently displeased with my singing, and then recalled the words which I suppose were offensive," Reed remembered. Whatever the words in this short patriotic poem that annoyed Reed's Superior, coming at the time of the Beecher/Fenwick lectures suggests that the school and local Catholics for that matter were sensitive to anything that might arouse disdain or criticisms, that instruction and religious life both inside and outside the Mount Benedict Convent would be challenging, and that teaching science could offer no panacea in this uneasy setting.[42]

25, 1831. These Beecher/Fenwick lectures surveyed in detail in Schultz, *Fire & Roses: The Burning of the Charlestown Convent, 1834*, 115-118, a book that also explores the burning of the convent, see Schultz, 147-189. Katie Oxx, *The Nativist Movement in America: Religious Conflict in the Nenteenth Century* (New York: Routledge, 2013) chapter 2, provides good larger context about this event. To help recover items stolen during the mob's attack on the convent, the convent's Superior requested local and regional newspapers to publish a list of student names and their known possessions in addition to principal items owned by the school, one such example appeared in "The Conflagration," *Saturday Morning Transcript Boston*, August 30, 1834.

[42] The school's epilogue discussed in Schultz, *Fire & Roses: The Burning of the Charlestown Convent, 1834*, 270-271. Jessica M. Lepler, *The Many Panics of 1837: People, Politics, and the Creation of a Transatlantic Financial Crisis* (New York: Cambridge University Press, 2013) touches on a few Boston moments of the Panic, see pgs. 51, 125, 130, and 147. Rebecca Theresa Reed, *Six Months in a Convent; or the Narrative of Rebecca Theresa Reed who was under the Influence of the Roman Catholics about Two Years, and an inmate of the Ursuline Convent on Mount Benedict, Charlestown, Mass., nearly six months, in the years 1831-2* (Boston: Russell, Odiorne & Metcalf, 1835), with her mention of "Ode on Science" on pg. 141. "Ode on Science" written in 1798 by Jezemiah Sumner of Tauton,

Catholic education rises from the ashes of Boston

Though the convent's burnt-out ruins "cast a dark shade upon the soil of Massachusetts," at least other options existed in Boston for the education for young girls, such as the progressive Temple School established by Amos Bronson Alcott with its basic offering of "language, geography, and arithmetic." When the time came to open a men's college in the Boston region, one sited among some of the oldest colleges in America like Harvard and Amherst, Bishop Fenwick made evident his determination to push back against this dark shade. In June 1843 he sanctified the cornerstone for the new College of the Holy Cross outside Worcester, a location picked to minimize religious friction, a school he "dedicated to the advancement of the arts, the cultivation of the sciences, and to the promotion of patriotism, morality, virtue, and religion" while demanding that "never again may rude hands kindle the blaze of conflagration in the halls of education." Holy Cross accepted only Catholic students, a decision made to diminish lingering anti-Catholic sentiment, sentiment that nevertheless persisted for over twenty years as the Massachusetts's legislature refused to grant the Jesuits running the college a legal charter which would have enabled the awarding of degrees. But at least for one spring day under a "clear and cloudless sky and bright sunshine," one speaker at this ceremony declared in reference to the two other principal Jesuit colleges then in operation, St. Louis and Georgetown, that for Holy Cross College he "anticipated for this equal success and equal patriotic service and public advantage." Conspicuously missing was any mention about the teaching of science compared to prior rhetoric regarding other newly founded Catholic schools.[43]

Massachusetts, as noted in Marion J. Hatchett, *A Companion to The New Harp of Columbia* (Knowville: University of Tennessee Press, 2003), 9.

[43] The school's ruins are described in The Ursuline Convent of Mount Benedict, Charlestown, Mass., *The Metropolitan Catholic Almanac and Laity's Directory for the Year of our Lord 1839*, 118-121, p.120. Details concerning Alcott's school, including the term card for Spring 1836, in Elizabeth Palmer Peabody, *Record of a School: Exemplifying the General Principles of Spiritual Culture* (New York: Leavitt, Lord & Co., 1836); quotation

Under these clouds of dark anti-Catholicism, Holy Cross would open its doors with a traditional and *safe* Jesuit curriculum which highlighted Latin and Greek while leaving science to a seventh and final year of study. Far from confirming a "siege mentality" as claimed by Kevles, this plan revealed geographically astute thinking on the part of Bishop Fenwick concerning the location of his new college 50 miles outside of Boston that facilitated a practical way forward for the school without inciting further religious tensions. That Fenwick contended with external antagonisms in setting up a school in the northern states generates little surprise, yet some surprise follows when another Catholic leader intent on founding a school purposely distanced himself not from an anti-Catholic populace, but from his authoritarian bishop over differences concerning diocesan plans. Here location also mattered when in November 1842 Father Edward Sorin accepted South Bend, Indiana, as the site of his intended college, a promising place that would also be several hundred miles removed from oppositional Bishop Hailandière in Vincennes.[44]

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from preface xxii. Alcott and his work with non-traditional education portrayed in Frederick C. Dahlstrand, *Amos Bronson Alcott: An Intellectual Biography* (Rutherford [N.J.]: Fairleigh Dickinson University Press, 1982), 109-129. The June 21, 1843 cornerstone ceremony report appeared in "Catholic College of the Holy Cross," *National Aegis*, June 28, 1843. On the location decision, Catholic-only admission policy, and charter difficulties at Holy Cross, see Anthony J. Kuzniewski, S.J., *Thy Honored Name: A History of The College of the Holy Cross, 1843-1994* (Washington, D.C.: Catholic University of America Press, 1999), 19-22 and 70-76. Chapters 1-5 from David R. Dunigan, S.J., *A History of Boston College* (Milwaukee: The Bruce Publishing Company, 1947) document these early frustrations with starting this institution. Further comments at the cornerstone ceremony from Rev. Charles Constantine Pise, a Catholic pastor in New York City and former chaplain in the U.S. Senate. The persistent anti-Catholic mood also impeded Massachusetts bishops from purchasing land needed to open a second men's institution in Boston proper, this being Boston College which would open in 1864.

[44] A student's view of the Holy Cross curriculum ca. 1848 explored in Philip Gleason, "The Curriculum of The Old-Time Catholic College: A Student's View," *Records of the American Catholic Historical Society of Philadelphia* 88:1/4 (1977), 101-122. Quotation from Kevles, *The Physicists: The History of a Scientific Community in Modern America*, 209. Sorin's difficulties with Bishop Hailandièr, who was based in Vincennes 250 miles from South Bend, explored in Marvin R. O'Connell, *Edward Sorin* (Notre Dame: University of Notre Dame Press, 2001), 76-100.

French Fathers land in Indiana

Father Edward Sorin, born, educated, and ordained in France, along with six other brothers and novices, all members of the Congregation of the Holy Cross, came to the United States in 1841 to serve in the Indian missions of Indiana. Sorin soon felt the keen need for a school to educate new priests to serve in a region where "the Catholic religion was . . . little known" and after some lively negotiations with his superior Bishop Hailandière he took on the task to build a college on lands near St. Joseph, now present-day South Bend, Indiana, where for years there had been "no pastor except the missionary from Chicago – 86 miles from here." Although remote from large cities, Sorin knew twenty Catholic families lived within seven miles of his planned institution to draw on for support and an initial font of students; this plus knowing God's "Providence had been good to us" would surely grant success to his boldly named new *University of Notre Dame du Lac*. Otherwise, as Fr. Sorin explained in a letter seeking support, it would mean to "refuse children when this refusal obliges them to enter Protestant colleges and there receive that which it will be so difficult afterwards to eradicate!"[45]

Yet for all these religious motivations that underscored this development, Sorin also focused on the practical aspects of starting a new school. It opened within a year in late 1843 when its first two students arrived: Alexis Coquillard from South Bend and Clement Recker from Fort Wayne, Indiana, non-Catholic and Catholic sons of a local businessman and recent German immigrants respectively. While they stayed at Notre Dame for just a few years with Recker

[45] Multiple tellings of Notre Dame's opening episode exist: Edward Sorin, C.S.C., *Chronicles of Notre Dame du Lac* (Notre Dame: University of Notre Dame Press, 1992), chapters 1 and 2, count of families on pg. 22; *A Brief History of the University of Notre Dame du Lac Indiana* (Chicago: The Werner Company, 1895), 44-53, first quotation from pg. 48; next two quotations from December 5, 1842, letter to Father General Moreau in France, from Edward Sorin, C.S.C., *Circular Letters of the Very Rev. Edward Sorin, Superior General of the Congregation of the Holy Cross and founder of Notre Dame* (Notre Dame, 1885), 259-264, pgs. 264, and 260; last quotation from support request letter written at the same time to Fr. [Pierre] Chappe in France, in Sorin, *Circular Letters*, 264-5. A new history of Notre Dame published in 2020 has little to say about science during my period of interest; see Thomas E. Blantz, C.S.C., *The University of Notre Dame: A History* (Notre Dame, Indiana: University of Notre Dame Press, 2020).

earning one of first premiums awarded in 1845, these two boys exemplified the kind of potential new students Fr. Sorin hoped to attract to build up his new school. Their classroom shared space in a hastily erected building that also housed the kitchen, bakery, and dormitory at the fledgling institution, and soon expanded to add a room for a celebrated natural history collection purchased from Dr. Louis Cavalli of Detroit. This collection of "beasts, birds, fishes, reptiles, antiquities, etc. from various parts of the globe" proved a huge draw among visitors present at this initial distribution of premiums and also helped to signal Sorin's clear aspiration to offer instruction in the various sciences. Altogether, these public activities went a long way in satisfying Bishop Hailandière's stipulation that Sorin have a functioning school within two years of his arrival to South Bend in order to secure from him the legal deed to Notre Dame du Lac and the surrounding lands.[46]

As Sorin drew attention to Notre Dame in these tangible and public ways, he also toiled behind the scenes to put his school on solid ground. With the help of John Defrees, a local lawyer who was also a state senator, the Indiana legislature passed an "Act to incorporate the University of Notre Dame du Lac" on January 15, 1844, that included language allowing the college to grant "degrees and diplomas in the liberal arts and sciences, and in law and medicine." Privately, Fr. Sorin had written his French superior in 1843 that under incorporation Notre Dame

[46] Details about these first students remain ambiguous given surviving records: research by John Theodore Wack, "The University of Notre Dame du Lac: Foundations, 1842-1857," unpublished dissertation, University of Notre Dame, 1967, pg. 62, mentions Theodore Coquillard (which is not correct as this was Alexis' much younger brother) and Clement Reckers (actually spelled Clemons Rekers on his tombstone) while O'Connell, *Edward Sorin*, 103, 131-2, and *A Brief History of the University of Notre Dame du Lac Indiana*, 54, list just Alexis Coquillard. The 1900 US Census indicates Clem Rekers immigrated in 1837 to Fort Wayne, Indiana, with his German parents where they lived and where he would die and be buried in a Catholic cemetery in 1901. The list of the first premiums given out in August 1845 is found in "1st Distribution of Premiums, Aug. 2, 1845," *The Scholastic* 8:32 (1875), 473; none are shown being awarded to Coquillard while Reckers received one for music. Details about Cavalli's collection in O'Connell, *Edward Sorin*, 140, *A Brief History of the University of Notre Dame du Lac Indiana*, 65, and that is was notable via a short newspaper article in the "Multiple News Items," *Laporte County Whig*, May 31, 1845.

would have "the right to confer all scientific degrees, like all the great colleges in the United States," so his competitive desire to teach science existed early as a crucial objective. Yet once the act passed, the college did not tout this new authorized ability to award all manner of degrees, a move that Georgetown University, for example, took immediately upon securing its 1815 Federal charter. Ten years passed before any annual Notre Dame catalogues mentioned this piece of legislation and then simply to say that "it was incorporated by the Legislature of Indiana in the year 1844." Thus, early attention given to science came to be voiced in other ways.[47]

Notre Dame could only improve as fast as its first students improved and the same held true for its faculty which consisted wholly of priests and brothers as no money could be allotted to hire proficient lay instructors. The school's primary curriculum or "English Course" began modestly in "embracing all the branches of a *practical* education" that, when it came to science, included mathematics, astronomy, and geography, but not natural philosophy or chemistry. Not only did this match up well to student needs and faculty abilities, it kept costs to a minimum by allowing readily available textbooks like Emerson's *North American Arithmetic for Young Learners* and Mitchell's *System of Modern Geography* to be used. These books were selected by a "Council of Professors" which also made decisions concerning general school operation, the awarding of premiums, and matters of student discipline at their regular meetings, thus guiding Notre Dame forward step by basic cost-effective step. Thus in 1845 when the first premiums were awarded, the subjects remained constrained to academic basics such as arithmetic, geography, and, in the case of young Recker, music. Yet notes from a Council of Professors

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[47] Charter published in the *Laws of a Local Nature, passed and published at the twenty-eightth session of the general assembly of the State of Indiana* (Indianapolis: Dowling and Cole, 1844), 61-2, and discussed in O'Connell, *Edward Sorin*, 141, as is the quotation from Sorin's letter to Father General Boreau in France dated November 8, 1843. Details about Georgetown's 1815 charter found early in my chapter 1. The tardy reference to this charter mentioned in the *Catalogue of the Officers and Students of the University of Notre Dame, Indiana, at the beginning of the Academic Year 1854-55* (Chicago: Office of the Western Tablet, 1855), 4.

meeting one year earlier reveal plans to someday offer instruction in natural philosophy and physical chemistry once student and faculty had reached an appropriate level. Thus, science delayed would not be science lost.[48]

These designs to teach sciences received a boost in 1846 with the arrival of Fr. Michael E. Shawe, a former British military officer ordained less than a decade earlier in Vincennes yet twelve years senior to Fr. Sorin in age. Shawe, who was already known to Fr. Sorin, wrote him in March 1846 to announce his coming to Notre Dame and said cryptically that "it would be superfluous to make any observation on the services I might render to the community." In the course of the two years Shawe remained at Notre Dame, his 'services' not only included classroom instruction where his native-English language skills proved invaluable, but also in bringing an outsider's point of view to the young institution's overall operation. For example, at one of his first Council of Professors meetings, he "observed that the pupils of the preparatory course knew their catechism better than anything else, and that our paying greater attention to the religious instruction of our pupils than to literature, gave a bad repute to the house." Agreeing with this and other related points made by Shawe, the professors concurred by noting that "the college would fall if these observations were not attended to."[49]

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[48] Notre Dame's 'English course' described in *The Metropolitan Catholic Almanac and Laity's Directory for the Year 1846* (Baltimore, 1846), 121-124, pg. 122, italics mine. Possible editions of these two texts were Frederick Emerson, *The North American Arithmetic: Part First for Young Learners* (New York: Collins, Brother, & Co., 1845), and S. Augustus Mitchell, *A System of Modern Geography* (Philadelphia: Thomas, Cowperthwait, and Co., 1845); they were labelled "Mr. Emerson's Arithmetic, Mr. Mitchell's large Geography" in the February 18, 1844, council records; *Register of the Council of Professors*, consisting of typed pages in three volumes with volume 1 covering January 1844 - April 1846, volume 2 April 1846 - April 1847, and volume 3 April 1847 - July 1848, Notre Dame Archives microfilm CIJ Reel 4, 1844, NDUA. At their September 1844 meeting, the council positioned natural philosophy and physical chemistry into the 'First Class' level which was effectively the fifth and final year of studies beyond the preparatory level.

[49] Besides mentions in O'Connell, *Edward Sorin*, 180-1 and 206-7, Shawe is passionately portrayed in Richard R. Elliott, "Soldier-Knight-Missionary, St. Michael Edgar Evelyn Shawe, first pastor of the Cathedral of Saints Peter and Paul, Detroit, 1792-1853," *American Catholic Historical Researchers* 14:2 (1897), 50-61. Shawe's letter to Sorin dated March 4, 1846, Notre Dame Archives, CSOR 2/02. Fr. Shawe also discussed in Wack, "The University of Notre Dame du Lac: Foundations, 1842-1857," 129-132.

Council of Professor's notes from this time show that Fr. Shawe contributed in the classroom by teaching a variety of subjects: literature, mathematics, history, geography, geometry, and natural philosophy. When Shawe arrived in the summer of 1846, premiums awarded in science stood at a minimum with one student, James Whelan of Buffalo, New York, receiving a combined award for "Oratorical composition, Zoology & Astronomy" plus a second prize for "Linear Drawing & book-keeping." Two years later at Notre Dame's July 1848 commencement prizes had expanded to offer awards in the "higher branches" in natural philosophy, geometry, algebra, and arithmetic while premiums in linear drawing and book-keeping remained for students in lower-level studies. Some credit for this progress belonged to Fr. Shawe when in October 1846 the Council asked him "to write to Georgetown, St. Louis & St. Mary's in Emmetsburg to have their plans of studies that we may compare them with ours & form a plan for ourselves." While this decision represented a tacit admission that Notre Dame's original French-patterned curricular "plan cannot be followed to advantage in America," it points out the constructive interconnectedness of American Catholic higher education institutions run by different Catholic orders during this period of growth. In the end as noted in the diary of one of the school's Catholic brothers, Shawe's efforts were rewarded as the Brother wrote "we shall for the future follow that [plan] of St. Louis, Mo."[50]

[50] The full list of premiums given out at the August 4, 1846, commencement found in volume 2 of the *Register of the Council of Professors*. Shawe's teaching duties discerned from volumes 2 and 3 of this same source while his being tasked to write a letter along with related council comments appeared in the notes from the council meeting dated October 1-2, 1846, in volume 2. List of 1848 premiums in *Solemn Distribution of Premiums at Notre Dame du Lac University, South Bend, St. Joseph County, Indiana, July 4th 1848* (Detroit: Munger & Pattison, Printers, 1848). Brother Gatian's Journal, Notre Dame Archives, from a typed copy of the longhand transcription from the original document; the entry mentioned was made sometime between the dates of June 9 and September 1, 1848. Further research might determine the rationale behind selecting the St. Louis University plan of studies, possibly because St. Louis and Notre Dame shared a common French-Catholic origin history as compared to Georgetown.

Shawe would be gone from Notre Dame by the time of its 1849 commencement when the school awarded its first two A.B. degrees. By 1850, the institution's annual catalogue showed a marked increase in the attention granted to science when it indicated "greater delights are reserved for the better portion of our pupils, for those who love their studies" especially "their progress in Natural Science [as] facilitated by an apparatus, a museum, and Mr. T. Cawin's collection of 4000 plants." In truth these 'delights' and 'progress' might have been lessened given that only one of the eight Notre Dame faculty listed in the catalogue appeared remotely close to teaching something related to science, this being Mr. F. X. Byerley, Professor of Mathematics and English. No matter as the one measurement of supreme concern to the pragmatic Fr. Sorin, the number of enrolled students, had approximately doubled to 56 from three years earlier, a welcomed sign that Notre Dame was finding its way with the help of these small constant improvements.[51]

Ten years after receiving its charter in 1844, Notre Dame had two more A.B. degrees to its credit, its annual catalogue boasted faculty expressly assigned to teach natural philosophy and chemistry with the latter subject taught by a local lay physician, frequent awarding of premiums in these and other allied fields, and a student body numbering 111 with 70% coming from outside of Indiana to attend Fr. Sorin's South Bend school. Notre Dame had overcome the disadvantage of its initially remote setting, a change in fortune due in part with South Bend now being positioned on a major east-west rail line and had become better known regionally in a way that

[51] Shawe's 'welcomed' departure told in O'Connell, *Edward Sorin*, 207. Henry N. Gillespie and Richard Shortis listed as receiving A.B. degrees in 1849 and both went on to become Congregation of the Holy Cross priests, see *University of Notre Dame Alumni Directory (as of September 1, 1934)* (Notre Dame, Ind.?: University of Notre Dame, 1934), 73. Institutional details from 1850 from *University of Notre Dame du Lac, 1850, South-Bend, Ind.* (South-Bend, Ind.: S. Colfax, 1850). My reading of 'an apparatus' takes 'apparatus' to be plural and the pronoun 'an' being in error by implying a single item. Sorin, *Chronicles of Notre Dame du Lac*, 84, offers little help only noting "The apparatus in question was some kind of scientific instrument."

would "induce many a discerning and anxious parent to patronize the University" to educate not just their sons, but their daughters as well.[52]

Midwestern Catholic education for women

Evidence of Father Sorin's larger educational plans to conduct female education appeared within a month of his arrival to South Bend as disclosed in a letter dated December 1842 to his superior Father Moreau in France hoping to welcome members from the French-based Sisters of the Holy Cross order to help at his budding college with "domestic work, but also for teaching; and perhaps, too, the establishment of an academy." His appeal resulted in a total of five sisters arriving from France by late 1843 to augment his small Notre Dame contingent where most worked behind the scenes with the operation of the school; the only hint of their presence appeared in advertisements which indicated that "the infirmary is entrusted to Sisters." More pertinent for Sorin's long-term goals become the transfer in the summer of 1844 of a group of these sisters and recent postulants six miles north of South Bend to Bertrand, Michigan, to establish a novitiate, a location selected by design to be outside of the jurisdictional control of Bishop Hailandière in Vincennes yet close enough to pool resources with Notre Dame in a collective effort to serve their respective charges and Midwestern Catholics in general.[53]

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[52] A pair of students received degrees in 1852, see the "Chronological List of Degrees Award by the University of Notre Dame," *Bulletin of the University of Notre Dame 1907-1908* 3:4 (1908), 9-25, pg. 9. School details gleaned from *Catalogue of the Officers and Students of the University of Notre Dame, Indiana, at the beginning of the Academic Year 1854-55*, inducement to parents quotation from pg. 9. The first passenger train stopped at South Bend on October 4, 1851; see *History of St. Joseph County Indiana* (Chicago: Chas. C. Chapmap & Co., 1880), 456.

[53] Quotation from Sorin's letter of December 5, 1842, in *A Story of the Fifty Years from the Annals of the Congregation of the Sisters of the Holy Cross* (Notre Dame, Indiana: The Ave Maria, 1905), 20. Details about the request, arrival, and Bertrand relocation of the French Sisters of the Holy Cross found in multiple sources: O'Connell, *Edward Sorin*, 142-157; Sorin, *Chronicles of Notre Dame du Lac*, 46-49; and Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 7:405-6. See "University of Notre Dame Du Lac," *New York Freeman's Journal and Catholic Register*, December 7, 1844, for one instance of this mention about the Sisters. An overview of this religious order found in S.M.A., "The Sisters of the Holy Cross," *The Catholic Educational Review* 2 (1911), 627-640.

Progress as a teaching institution came slowly to what would be called St. Mary's Academy with a handful of local children as its first students. Developments accelerated with the arrival in 1849 of Mother Marie du Sauveur from the order's Canadian motherhouse to become the community's new Superior. As "a woman of discernment as well as of superior education," she would upgrade the school's overall plan of studies to now include attention to the teaching of science, something confirmed by the school's 1850 Prospectus which highlighted that "the institution possesses a fine Philosophical and Chemical Apparatus, Globes, and a Planetarium." Incorporated that same year by the Michigan legislature to act as "necessary for the promotion of the arts and sciences and the prosperity of the said Academy," Mother du Sauveur's efforts paid off with increased enrollment with 50 students now boarding at the school. That and perhaps by having a copy of Brocklesby's *Elements of Astronomy* among its library of books.[54]

Yet continued growth remained elusive as the academy's ability to attract students again waned along with its overall financial health. Unlike the Jesuits who in 1846 moved a failing Kentucky school to New York City where more students would be found, Father Sorin decided to relocate St. Mary's Academy adjacent to Notre Dame on recently purchased properties where economies of scale between the two schools and improved access to public transportation might benefit the struggling female institution. Indiana law permitted the academy to incorporate with little delay at its new location and soon advertisements for the now paired Holy Cross-run institutions began to appear in newspapers and other publications, though these notices would place more attention on the study of music at St. Mary's versus science. No doubt St. Mary's

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[54] These late 1840s developments noted in Sister M. Eleanore, *On the King's Highway: A History of the Sisters of the Holy Cross of St. Mary of the Immaculate Conception Notre Dame, Indiana* (New York: D. Appleton and Company, 1931), esp. pgs. 155-159. St. Mary's incorporation documented in *Acts of the Liegislature of the State of Michigan passed at the Annual Session of 1850* (Lansing: R. W. Ingals, State Printer, 1850), 389-390. According to Amanda Devine, et al., *Saint Mary's College* (Chicago: Arcadia Publishing, 2001), Brocklesby's *Elements of Astronomy* was utilized starting in 1851; see pg. 30.

made a sensible choice to press ahead based on the known strength of its available staff, a person such as Sister Mary of St. Elizabeth who made music her life's work at the academy. For the moment, extra music and passable science proved a viable strategy.[55]

These curricular priorities stood out at the academy's June 1860 commencement which featured a dozen student performances of musical exercises, a full chorus "coronation ode" in celebration of Mary Elizabeth Dennis, the school's first valedictorian, a concluding 'Farewell to St. Mary's' chorus, and many premiums in the musical arts amid a smattering of science premiums in natural philosophy, astronomy, and chemistry. Enrollment had grown to 100 students and would double in the next five years. By 1864 music required no improvement as "its excellence is appreciated by the public as is testified by the continually increasing number of music pupils" while science education at St. Mary's grew stronger when the "skillful professors from the University of Notre Dame" travelled the short distance between campuses to deliver science lectures throughout the year. Given this latter improvement, it became easy for the academy to claim that "the routine of instruction combines the solidity of scientific and literary pursuits with those lighter and more graceful accomplishments . . . ."[56]

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[55] Sorin's efforts related to the repositioning of St. Mary's Academy explained in O'Connell, *Edward Sorin*, 347-8. The Jesuit transfer of St. John's College detailed earlier in this chapter. The first east-west railroad passing through South Bend came in 1851; see Timothy Edward Howard, *A History of St. Joseph County, Indiana* (Chicago: Lewis Publishing Company, 1907), 2:632. Note that Howard was an 1862 graduate of Notre Dame and later a lay science professor at the college. As of February 28, 1855, Indiana schools could incorporate without explicit approval from the state General Assembly, see the *Laws of the State of Indiana passed at the thirty-eighth session of the General Assembly begun on the 4th day of January, A.D. 1855* (Indianapolis: Austin H. Brown, State Printer, 1855), 186-9. Two representative advertisements include "Notre Dame University and St. Mary's Academy," *Daily State Sentinel*, January 22, 1858, 4, and "St. Mary's Academy," *Daily State Sentinel*, November 12, 1859, 4. Sister Mary and her dedication to music teaching described in Eleanore, *On the King's Highway: A History of the Sisters of the Holy Cross of St. Mary of the Immaculate Conception Notre Dame, Indiana*, 191.

[56] Details about St. Mary's and its 1860 commencement from *Fifth Annual Catalogue of St. Mary's Academy, Notre Dame, Indiana* (Chicago: Daily Chicago Herald Steam Printing Establishment, 1860). Information and quotations dated 1864 from the school's advertisement in *Sadlier's Catholic Almanac and Ordo, for the year of our Lord 1864* (New York: D. & J. Sadlier & Co., 1864), 13.

The rush to open a college in California

In marked contrast to Catholicism being 'little known' in Fr. Sorin's northern Indiana situation, residents of Mexican California knew a long tradition of Catholicism arising out of the Spanish explorations of the early 1700s and through the successful Mexican revolt from Spain by 1821. In 1824 the Mexican constitution declared Roman Catholicism "la religion de la nacion" which kept in place what little development had been achieved regarding education in Alta California. Although the Jesuits had been expelled from Mexico in 1767 by then Spanish ruler Charles III, the Franciscan Order immediately took their place with Father Junipero Serra founding a string of 21 missions from San Diego northwards that granted education a slight priority, primarily to teach the indigenous Indian population the Catholic Catechism as part of Franciscan conversion efforts. This work faltered and by the late 1830s and early 1840s both the Franciscans and their missions stood in disarray with the few schools in large cities such as Los Angeles being run on a more local basis. Thus, in fall 1849 when a pair of Italian Jesuits, Fathers Michael Accolti and John Nobili, departed their Jesuit mission post in Oregon and came ashore at Yerba Buena, then the "Golden Gate" entrance to the California goldfields and now better known as San Francisco, to appraise the needs of the church in this newly arisen "madhouse or Babylon," they discovered a neglected educational scene much in need of schools, Catholic or otherwise.[57]

[57] Catholicism infused much of California's early history, see Ramón A. Gutiérrez, et al. (eds.), *Contested Eden: California before the Gold Rush* (Berkeley: University of California Press, 1998), primarily chapters 4, 5, and 8. Catholicism declared the national religion in *Constitucion Federal de los Estados Unidos Mexicanos* ([Mexico]: Impr. del supremo gobierno, 1824), 2. The Charles III decree in addition to the Franciscans and their California schools found in Rev. J. A. Burns, *The Catholic School System in the United States: Its Principles, Origin, and Establishment* (New York: Benziger Brothers, 1908), pgs. 52-65. Added details about the Franciscans and their failing missions found in Jane M. Rausch, "Frontiers in Crisis: The Breakdown of the Missions in Far Northern Mexico and New Granada, 1821-1849," *Comparative Studies in Society and History* 29:2 (1987), 340-359, pgs. 341-343. My example Los Angeles school ca. 1836 discussed in *Contested Eden*, chapter 6, pg. 151. Details on Jesuit mission work in Oregon found in Wilfred P. Schoenberg, *Paths to the Northwest : a Jesuit history of the*

Accolti and Nobili thus labored to find scholastic gold amidst a California in a greatly animated condition given its recent independence from Mexico in 1848 on top of the discovery of gold at Sutter's Mill that same year. The California Gold Rush had made the place into an international destination that quadrupled the population of the San Francisco and adjacent areas within a year with about half of the adults occupied with some aspect of mining. This growth and associated economic activity generated the need for a more formal and stable government and resulted in a constitutional convention held in September 1849 leading to California becoming the 31st state the following year. California's new constitution contained an article (Article IX) that touched lightly on education in seeking "the promotion of intellectual, scientific, moral and agricultural improvement," but did little more than set in motion a long discussion that left essential details like funding for the state legislature to handle at a later time. Establishment of a general system of education would be delayed as well as endowing a university envisioned to take in "literature, the arts and sciences." California's first governor, Peter Burnett, confirmed this approach in his 1851 'state-of-the-state' message when he explained that "we have so few families in the State, and our population is so unsettled, it may not be practicable to establish any general system of Free schools, or to endow any University." Thus, the first Californians would be forced to rely on alternative educational options for their children and, for these recently landed Jesuits, they knew a promising foothold when they saw one.[58]

Oregon Province (Chicago: Loyola University Press, 1982); added information about Nobili and Accolti found on pgs. 44-46, including Accolti's quoted initial impression of the wretched city of Yerba Buena.

[58] General history of California provided by Andrew Rolle, *California: A History* (Wheeling, Illinois: Harland Davidson, Inc., 1998), esp. chapters 14 and 15. California never existed as a U.S. territory as it went straight to statehood. Quotations from Article IX from Roy W. Cloud, *Education in California: Leaders, Organizations, and Accomplishments of the First Hundred Years* (Stanford: Stanford University Press, 1952), pp. 248-9. Burnett's speech published in the *Journals of the Legislature of the State of California at its second session* (n.p.: Eugene Casserly, State Printer, 1851), 788-815, quotation on pg. 805.

Encouraged by an appeal from a San Francisco Catholic priest (and friend of Accolti) who asked for their help in serving the neglected spiritual and educational needs of a swelling population of California Catholics, Accolti proved especially eager to help and took the initiative to contact the Jesuit General in Rome who he wrote in May 1849 to report that "everyone is asking for a Jesuit College." However, the actual work of instituting a longed-for school fell to Nobili after he was assigned to the nearby Santa Clara parish in March 1851. Displaying his own strong enthusiasm for a school, Nobili gladly accepted his bishop's offer of the former Franciscan Mission at Santa Clara as the site of a new college which opened two months later in May before formal approval from Rome had arrived. Advertised in the local newspaper, this "school in Santa Clara" boasted "the promotion of education in all its branches" though without any express mention of science. The next year proved difficult as Nobili described the situation at the school in an 1852 letter to a colleague as "anything but prosperous and encouraging." Though the "ecclesiastical and civil authorities and the people in general were very anxious to see a college opened," funding to run or staff his new school was less than forthcoming. Here Nobili's financial ingenuity along with modest tuition fees addressed these worrying financial issues and not only allowed for the hiring of a few lay teachers but enabled the acquisition of an extensive scientific instrument collection for use in instruction.[59]

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[59] Details on the arrival of Accolti and Nobili, see John Bernard McGloin, "The Jesuit Arrival in San Francisco in 1849," in Gloria Ricci Lothrop (ed.), *Fulfilling the Promise of California: An Anthology of Essays on the Italian American Experience in California* (Spokane: California Italian American Task Force and The Arthur H. Clark Company, 2000), 47-56. Also see the helpful book by McKevitt, *The University of Santa Clara: A History, 1851-1977*, 14-22. Accolti's letter to Johann Roothaan, Jesuit General in Rome, dated 24 May 1849, located in the Archivum Historicum Societatis Iesu (California Collection), Rome, quotations in McKevitt, *The University of Santa Clara: A History, 1851-1977*, 15,17. News of the new Santa Clara school in "School in Santa Clara," *Daily Alta California*, May 16, 1851, 2. Nobili's 1852 letter quoted in Giovanni Schiavo, *Italian-American History: The Italian Contribution to the Catholic Church in America* (New York: The Vigo Press, 1975), 2:199. Quotation about seeing a college opened in the letter dated May 13, 1850, from Peter John DeSmet, S.J., to Rev. Fr. Lancaster, S.J. Copy is in DeSmet "Letter Book," St. Louis University, quoted in McGloin, "The Jesuit Arrival in San Francisco in 1849," 55. Further discussion about Santa Clara found in Michael Brett Weismeyer, "Science Education in Early California Colleges, 1850-1880," unpublished dissertation, University of California Los Angeles, 2017, esp. his chapter 2.

When this new Jesuit institution first opened its doors in 1851 to a dozen or so students, they found freshly painted buildings, lodgings with scarcely any comforts, a modest library of 250 books left over from the former Franciscan Mission, and a curriculum consisting of courses at the introductory level. Yet in short two years, enrollment had grown to seventy-eight students and courses now included subjects such as geometry and algebra. By the 1854-55 school year, enrollment exceeded 110 students and the college's first published prospectus could claim that "the library attached to the Institution already numbers ten thousand volumes." In addition, the prospectus boasted that "a complete philosophical and chemical apparatus...was expected from Paris," a public indication of Santa Clara's early and certain commitment to teach science at a high level. Thus, into Nobili's new school would come a level of science instruction hitherto unknown in California and allow Santa Clara College to declare itself as "a favorite abode of science, morality and religion, in no way inferior to any other Institution for the education of youth."[60]

The pressing pursuit of science at Santa Clara College came from two directions. First, science enjoyed a strong place within the Jesuit curriculum via the *Ratio Studiorum*, the codified Jesuit program of learning with its three highest divisions: philosophical, theological, and humanistic. Science-related topics such as physics and mathematics appeared in the first of these divisions. Also, during the previous century Jesuit teaching had become responsive toward experimental natural philosophy and the use of scientific apparatus; here Nobili's purchase of a complete set of teaching apparatus from Paris aligned securely with this sanctioned teaching aim.

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[60] McKevitt, *The University of Santa Clara: A History, 1851-1977*, 26-28. *Prospectus of Santa Clara College, with a catalogue of the officers and students for the year 1854-5* (San Francisco: O'Meara & Painter, Printers, 1855), 4. Also consult Part 1 (of 3) of the typed manuscript by Henry L Walsh, S.J., The Annals of Santa Clara College and University, 1955, for the years 1851-1909, SCUA.

Second, a need for science had emerged in response to the cultural and social circumstances in Gold Rush California during this time. Accordingly, the courses offered at Santa Clara, which "were more numerous than any known up to that time in California," included many allied with science such as chemistry, assaying, physics, astronomy, mathematics, and surveying.[61]

Nobili's actions in terms of purchasing expensive scientific instruments from overseas, knowing full well that they would not arrive for years, suggests he had a long-term vision for the place of science at Santa Clara. An Italian-educated Jesuit, Father Nobili never passed through the more academically developed eastern United States and thus he had not been exposed to the scientific traditions of antebellum American colleges. Yet his decision to order instruments from a French instrument maker to teach science may have stemmed from his awareness of and desire to avoid the higher taxes attached to American instruments. Furthermore, arrangements for this extensive purchase may have been made with help from a network of Jesuit friends and former classmates in Europe. Not only would this investment improve the ability of the school to teach science, in the meantime its mention in Santa Clara's catalogues and newspaper articles would help to attract students as did its appearance on stage at future graduation events.[62]

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[61] Farrell, *The Jesuit Code of Liberal Education: Development and Scope of the Ratio Studiorum*, 342-345. Also Robert Schwickerath, *Jesuit Education: Its Principles viewed in the light of Modern Educational Problems* (St. Louis: Becktold Printing and Book Mfg. Co., 1904). Early Jesuit traditions in science discussed in Marcus Hellyer, "Jesuit Physics in Eighteenth-Century Germany: Some Important Continuities," in John W. O'Malley, et al. (eds.), *The Jesuits I: Cultures, Sciences, and the Arts 1540-1773* (Toronto: University of Toronto Press, 1999), esp. 542-545. Besides Cloud, *Education in California: Leaders, Organizations, and Accomplishments of the First Hundred Years*, also consult William Warren Ferrier, *Ninety Years of Education in California 1846-1936, A Presentation of Educational Movements and their Outcome in Education Today* (Berkeley: Sather Gate Book Shop, 1937). About the many courses at Santa Clara, see Schiavo, *Italian-American History: The Italian Contribution to the Catholic Church in America*, 201.

[62] When it came to teaching physics in American colleges in the antebellum period, see Guralnick, *Science and The Ante-bellum American College*, 60-77, esp. 70-74. The matter of instrument taxation recorded in the *Journal of the Senate of the United States of America, begun and held at the City of Washington, December 1, 1845* (Washington: Ritchie & Heiss, 1846), 398, on Friday, July 10, 1846, when a "Mr. Morehead" tendered a request that "scientific apparatus" along with other items ordered by a "college" be free of import duty. It is not known if this resulted in an actual law by 1851 or if Nobili had knowledge of this potential law; more research is called on this point, not just for Santa Clara, but all American colleges and universities active during the last half of the 19th century. About French scientific apparatus being brought to the United States, see Deborah Jean Warner, "French Instruments in the United

A second investment made by Nobili, the hiring of Bernard J. Reid as a lay member of Santa Clara's teaching staff in 1851, paid off in helping Santa Clara College survive a difficult first year. Earning $100 per month, Reid filled an evident gap in the school's curriculum by teaching mathematics, English, and Spanish, with English being especially valuable as Nobili "distrusted his command of good English." Having previous teaching experience in his native Pennsylvania, the Catholic Reid found that he liked this employment and, on occasion after an evening meal, engaged in "scientific conversations" with students. Although he stayed for just one year, Reid's engagement helped to assure parents that the new school's initial 12 students received the advertised education.[63]

Just when science started coming into view at Santa Clara, Fr. Nobili stepped on a rusty nail and died a difficult death from tetanus on March 1, 1856. Yet in those five years under his guidance the college legally had incorporated and became "empowered to confer degrees and academical honors, and to exercise the same rights and privileges exercised by any other literary institution in the United States." Moreover, the long-awaited delivery of scientific instruments from Europe enabled the first of many public opportunities for drawing attention to the presence of science at the institution, such as the college's 1857 commencement exercises when it awarded its first B.A. degree and its 1857-58 prospectus that touted a "complete philosophical and chemical apparatus from the best manufacturers of Paris, which cost the institution nearly ten

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States," *Rittenhouse* 8:1 (1993), 1-32. One example of Jesuit teamwork occurred when Father DeSmet of St. Louis College obtained in 1834 "a complete physical science cabinet, including a collection of minerals" from a French Jesuit college being closed after the Ordinance of 1828; see Laveille, *The Life of Father DeSmet, S.J.*, 66. The 1857 commencement included an "experimental lecture on chemistry" and other topics well matched to the new apparatus from France, see "Letter from Santa Clara," *Daily Alta California*, July 12, 1857, 1.

[63] Details regarding Reid in Mary McDougall Gordon (ed.), *Overland to California with the Pioneer Line: The Gold Rush Diary of Bernard J. Reid* (Stanford: Stanford University Press, 1983), 168-171 and 180-181. See also Patricia Nelson Limerick, *The Legacy of Conquest: The Unbroken Past of the American West* (New York: W.W. Norton & Company, 1988), 100-102. Enrollments for Santa Clara from 1851 to 1978 listed in Appendix A in McKevitt, *The University of Santa Clara: A History, 1851-1977*, 325.

thousand dollars." The list of items appeared comprehensive: "twenty-eight instruments or machines for experiments in MECHANICS, twenty-six for HYDRAULICS, fifty for ELECTRICITY, sixty-nine for OPTICS," etc. The strategy of attracting attention through promoting its collection of expensive scientific instruments served the college well as it was clear this new school addressed the question raised earlier at the 1849 California State Constitution Convention of "why should we send our sons to Europe to finish their education?" Santa Clara also gave parents a convincing reason to believe their children would obtain an education "on a level with the best educational establishments in the Union" where its blend of science, morality, and religion reduced concerns that Santa Clara existed only to indoctrinate students in the Catholic faith, particularly for the many Midwestern Protestants who had emigrated to California during the Gold Rush "with a lingering suspicion of Roman Catholicism." Former teacher Bernard Reid confirmed this downplaying of religion in a 1852 letter that at Santa Clara during his time "one half of the boarders are Protestants" for the straightforward reason of "their parents preferring that school to any of the Protestant schools in the country."[64]

[64] First mention of Santa Clara's incorporation in *Prospectus of Santa Clara College, with a catalogue of the officers and students for the year 1854-5*. The "late Nobili" indicated in *Prospectus of Santa Clara College, California, with a catalogue of the officers and students for the year 1855-6* (San Francisco: O'Meara & Painter, Printers, 1856). All the instruments from Paris arrived and the first B.A. degree being awarded to Thomas Bergin of San Francisco at the July 9, 1857, commencement noted in the *Prospectus of Santa Clara College, with a catalogue of the officers and students for the year 1856-7* (San Francisco: O'Meara & Painter, Printers, 1857); capital letters for the instrument categories in the original. State convention question from William Warren Ferrier, *Origin and Development of the University of California* (Berkeley: Sather Gate Book Shop, 1930), 8. The "best" education quotation from *Prospectus of Santa Clara College, with a catalogue of the officers and students for the year 1858-9* (San Francisco: O'Meara & Painter, Printers, 1859). Protestant worries about Catholicism noted in Ferenc Morton Szasz, *Religion in the Modern American West* (Tucson: University of Tucson Press, 2000), 61. Reid's observation from his August 21, 1852, letter under the penname "Gerald" in the newspaper section "Letter," *The Pittsburgh Catholic*, October 16, 1852.

The first Catholic Bachelor of Science degree awarded

The emphasis on science at Santa Clara reached greater heights when the school awarded its first Bachelor of Science degree to Amstead Burnett, youngest son of California's first governor Peter H. Burnett. When examined in mathematics at his 1859 commencement, a ceremony watched by an audience of nearly two thousand visitors, Burnett earned "especial mention for the proficiency he exhibited" as reported by the local newspaper. Two years previously, he had received medals for studies in "natural philosophy, geometry, algebra, and for Latin," plainly showing himself as an able student at this young Jesuit college. After graduating, Burnett turned to the study of law to follow in his father's footsteps, but, unfortunately, died from smallpox three years later in 1862 before he could make full use of the science and other learning cultivated at this school. Another student, Jesus Maria Estudillo, the eleventh child of an upper-class *Californios* family, found the science taught during the 1860s much to his liking based on diary entries describing studies about "some experiments performed on Liquids or Non-Elastic Fluids in motion," a chemistry lecture where "soda water was made," an assignment to "write a lecture upon the analysis of the silver ores of Washoe," and "an interesting class in astronomy, [where] we learnt how to find out when the moon would be full of new moon." Such was his fascination with science that he subscribed to *Scientific American* for several years. After attending Santa Clara on and off over a period of seven years, continued financial difficulties within his family compelled Estudillo to discontinue his studies without receiving a degree, whereupon he took a bookkeeping position. While science thrived at Santa Clara, circumstances sometimes prevented its students and graduates from taking full advantage of the school's offerings.[65]

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[65] Burnett's graduation described in "Commencement at Santa Clara College," *Daily Alta California*, July 8, 1859, and his medals two years earlier in "Letter from Santa Clara: Examination of the Santa Clara College," *Daily Alta*

That the Jesuits at Santa Clara practiced what they preached when it came to teaching science did not go unnoticed by visitors to the Golden State. A traveler in the early 1860s called Santa Clara College "a literary and scientific institution" that allowed "the youth of California" to "acquire a thorough classical, mathematical, philosophical, and generally accomplished literary education, without the risk and cost of travel to the Atlantic States." He mentioned that the "philosophical apparatus [was] as perfect as neatness, liberality, good taste and good judgment can make them." A backhanded compliment to Santa Clara came from another visitor who referred to the College of California in Oakland, which would become the University of California in 1868, as "a small-fry affair, but it is the best in the state, and the largest except a *Jesuit College*." While Berkeley would outpace Santa Clara by the mid-1880s in size and degree production, Santa Clara had the distinction of having awarded 26 B.S. degrees before its San Francisco Bay competitor granted its first such credential.[66]

This success did not occur by accident as Santa Clara benefitted from having solid staffing in all departments, including the sciences whereby the time of Burnett's 1859 B.S. degree four out of eleven ordained Jesuits at this young college taught natural sciences, chemistry, astronomy, and mathematics, figures on par with what Bruce found about American colleges in the 1850s. With an enrollment of 125 at the time, demand became such that these

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California, July 12, 1857. His death was noted in "Died," *Sacramento Daily Union*, June 4, 1862. Estudillo gains invaluable attention from Margaret Schlichtmann (ed.), *Sketches of California: The Journals of Jesus M. Estudillo* (Fredericksburg: The Awani Press, Inc., 1988), with above quotations and comments on pgs. 52, 58, 63,148, and 147.

[66] First traveler comments from H. Willis Baxley, *What I Saw on the West Coast of South and North America and at the Hawaiian Islands* (New York: D. Appleton & Company, 1865), 433. Second traveler comments from Francis P. Farquhar (ed.), *Up and Down California in 1860-1864: The Journal of William H. Brewer, Professor of Agriculture in the Sheffield Scientific School from 1864 to 1903* (Berkeley: University of California Press, 1966), 368, given in a journal entry dated February 7, 1863, italics mine. The University of California awarded its first B.S. degree in 1873 to Ebenezer Scott, from the *Directory of Graduates of the University of California 1864-1916* (San Francisco: N.C. Peterson and Louis Roesch Company, 1916), 2; Santa Clara College had awarded 26 B.S. degrees by this year, see McKevitt, *The University of Santa Clara: A History, 1851-1977*, 326, about these numbers.

Jesuits apparently felt a need to open a second college, a school which opened in 1855 as St. Ignatius College in San Francisco to an initial intake of 23 students. Incorporated four year later and awarding it first degree in 1863, a B.A. to Augustus Bowie who went on to become a well-known mining engineer, Santa Clara's new sister school also embraced the teaching of science down to having its own "very extensive and choice collection of apparatus manufactured to order in Paris" for its science department. In 1880 at the dedication of three new buildings at St. Ignatius, the California governor in his letter of congratulations warmly praised the Jesuits for their "glorious work" and "the devotion in this great work dedicated to science, learning and morality." In these early decades Santa Clara and St. Ignatius exemplified welcomed improvements not only for Catholic education through their devoted investment in teaching science, but also for higher education in general for a part of the country lacking in colleges. Catholic higher education on the American far west coast now had gained a foothold with a pair of unintended, but quickly prosperous, colleges.[67]

The California gold rush boom echoed in the classrooms of these two Jesuit colleges and helped fuel their expansion and amplify instruction in science to good ends. At the same time an older Jesuit college on the east coast achieved national prominence in science not by flaunting a vast collection of European scientific apparatus, but with a single new instrument when Georgetown College built one of the better observatories in the country. Employed mostly for

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[67] Number of Santa Clara faculty and enrolled students tabulated from the *Prospectus of Santa Clara College, with a catalogue of the officers and students for the year 1858-9*. Comparative figures about faculty from Bruce, *The Launching of Modern American Science 1846-1876*, 84. Details about St. Ignatius from Joseph W. Riordan, *The First Half Century of St. Ignatius Church and College* (San Francisco: H.S. Crocker Company, 1905), chapter 3; about Bowie on 125 and 382; and number of early pupils on 378. Bowie best known for his book Aug. J. Bowie, Jr., *A Practical Treatise on Hydraulic Mining in California* (New York: D. Van Nostrand, 1885) Quotation about St. Ignatius's own set of instruments from Paris in *Catalogue of St. Ignatius College, San Francisco, California, for the academic year, 1876-1877* (San Francisco: P. J. Thomas Steam Book and Job Printer, 1877), 4. Governor George C. Perkins' letter quoted from "Letter from San Francisco, St. Ignatius College, San Francisco, May 1, 1880," *Woodstock Letters* 9 (1880), 181-6, pg. 186.

teaching, this imposing new instrument helped pull Georgetown out of its doldrums when it came to teaching science while granting comet-like momentary fame to the observatory's founder James Curley.

Georgetown College catches a second wind

In the decade after Charles and George Dinnies had received Georgetown's first baccalaureate degrees in 1817 the college appeared dutiful, if unambitious, when it came to teaching science. While the college enjoyed the teaching services of two emigre Jesuit scholars gifted in natural philosophy and mathematics in the early 1820s, administrative problems contributed to a long decline in enrollment from a record high of 119 students when the Dinnies graduated down to just 38 by 1826. Staffing issues frequently topped the list as when the Rev. Francis Dzierozynski from Poland found himself taken away from teaching science and given over to administrative duties with the larger American Jesuit mission, or when Irishman the Rev. Thomas C. Levins, who "possessed a very extensive knowledge of mathematicks and philosophy," left Georgetown for New York City in late 1824 shortly before being dismissed from the Jesuit order in 1825. The tone given to science sounded flat as well when in 1826 Father William Feiner, then prefect of studies, cautioned his students "to let the modesty of virtue neutralize the arrogance of science," a stance not strictly out of alignment with John Carroll's 1787 aspirations for "communicating science" to students, yet one yielding little room for curricular advancement. Only when a new cohort of administrators took over in 1829, a group made up of American Jesuits who received their training in Rome, did this dour attitude toward science begin to change.[68]

[68] Dinnies already mentioned in chapter 1. Details about Dzierozynski, Levins, and problems at Georgetown in the 1820s available in Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 90-103; enrollment numbers from the same volume, appendix A. Levin's abilities noted in a letter titled "To Thomas Jefferson from Alexander Macomb, 4 December 1824," National Archives. Feiner's remarks found in

As this Jesuit college replenished its faculty, it again drew on one of its own with Father James Curley being transferred from Washington Seminary to Georgetown to teach natural philosophy and mathematics starting in 1831. Curley had emigrated to America from Ireland at age 21 the year the Dinnies brothers graduated and would enter the Society of Jesus in 1827. Mostly self-taught in these realms of science, he balanced a terrestrial interest in botany with keen skyward-looking eyes which aided his keeping weather records during the 1830s in addition to making astronomical observation when, for example, early on the morning of September 20, 1835, he displayed his knowledge of the heavens by situating Halley's comet by star name as "between Capella and Castor" and noted its "nebulous appearance." Astronomy had long been studied at Georgetown with the aid of globes as evidenced by former Jesuit and professor at Georgetown James Wallace's 1812 book on the use of globes and particularly the book's first question that asked the student to give the latitude and longitude of Washington, D.C., values not very well established at the time. Inspired in 1838 by a display of the astronomical instruments destined for the soon departing Wilkes Exploring Expedition, Curley intuited an opportunity to not only improve astronomy instruction at the college, but to maybe better these essential geographical measurements as well.[69]

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the "Report of the Prefect of Studies, March 20, 1826," in the Classical Journal of the College, 93, located in the Georgetown University Archives, quoted in Daley, *Georgetown University: Origin and Early Years*, 239.

[69] Curley's early history in Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 140-1. His preserved weather notes where he mentioned seeing Halley's comet in James Curley materials, Folder 4, Temperature Records, GTUA. Wallace previously well discussed in chapter 1, student work problem and mention about the location of Washington, D.C., being "not, as yet, so correctly ascertained" in Wallace, *A New Treatise on the Use of the Globes and Practical Astronomy; or a Comprehensive View of the System of the World*, 50. Curley's examining and consequent effort to acquire a new astronomical observing instrument for his college in Francis J. Heyden, S.J., *The Beginning and End of a Jesuit Observatory (1841-1972)* (Quezon City, Philippines: Manila Observatory, 1975), 1. The public display of "scientific instruments intended for the Exploring Expedition" reported in "From out Correspondent, Washington, June 9, 1838," *New York American*, June 15, 1838, 2. An overview of the expedition appears in Herman J. Viola, et al. (eds.), *Magnificent Voyagers: The U.S. Exploring Expedition, 1838-1842* (Washington, D.C.: Smithsonian Institution Press, 1985).

Having set eyes on an Ertel & Sohns Universal or Altitude and Azimuth Instrument and knowing its potential value in teaching at Georgetown, Father Curley's power of persuasion worked to full measure to convince the institution's rector of studies to part with $1000 to purchase one of these German-made instruments. Not only did the acquisition aid in astronomy instruction as expected, in 1841 it inspired Thomas Meredith Jenkins, a Jesuit scholastic known to the school, to propose to Curley the building of an actual observatory to which Jenkins would contribute $8000. After a little wrangling with the Jesuit General in Rome over permission to proceed, construction began in 1843 of a building designed and laid out by Curley with three-foot thick foundation, support piers made of granite for three telescopes, and room for a library. On order were new instruments from Europe, including the observatory's primary telescope, a 4.8 inch Troughton & Simms equatorial from London along with two meridian instruments, a 6½ foot transit by Ertel and a 45-inch circle by Troughton & Simms. Sidereal clocks, necessary for making transit observations, were bought from Molyneaux of London as well. Ready in late 1844 Georgetown's new observatory put it in elite company, not only as the first Catholic college to have an observatory of this high stature, but simply as one of the few observatories yet founded in the United States. Situated less than two miles from the equally well-equipped U.S. Naval Observatory completed the prior year, Curley promptly put his own telescopes to good use in teaching and then for some investigations of his own.[70]

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[70] Curley's "Irish persistence" described in Heyden, *The Beginning and End of a Jesuit Observatory (1841-1972)*, 1. Details about the funding and construction as well as diagrams of the observatory given in Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 139-143. Instrument details in Curley, *Annals of the Astronomical Observatory, Georgetown College, D.C., No. 1*, 11-14. About the origin of the U.S. Naval Observatory, see Steven J. Dick, "How the U.S. Naval Observatory Began, 1830-65," in Steven J. Dick, et al. (eds.), *Sky with Ocean Joined: Proceedings of the Sesquicentennial Symposia of the U.S. Naval Observatory* (Washington, D.C.: USNO, 1983), 167-181. A table of the small number of U.S. observatories in Marc Rothenberg, "The Educational and Intellectual Background of American Astronomers, 1825-1875," unpublished dissertation, Bryn Mawr College, 1974, 2. In 1856 Elias Loomis lists then active observatories, including Georgetown, consult Elias Loomis, *The Recent Progress of Astronomy; especially in the United States 3rd edition* (New York: Harper & Brothers, 1856), 237-240.

From the start Curley's priority for the observatory "was the instruction of students and others in the use of fine astronomical instruments" as Georgetown could now easily go beyond classroom teaching with globes and offer students experience in doing precision positional astronomy with modern instruments. An early beneficiary of Curley's work to modernize teaching of astronomy was Edmond R. Smith of New York whose student notebook dated March 1846 detailed his work in using observational data to calculate transits of the moon and stars over Georgetown. When he graduated in 1848, Smith secured a position with the U.S. Naval Astronomical Expedition as the "captain's clerk and to serve as the expedition's artist" no doubt owing to his complete academic education which comprised hands-on astronomy, but also that the expedition's captain, James M. Gilliss then connected with the U.S. Naval Observatory, enjoyed a personal scientific connection to Fr. Curley over matters of astronomy. There exists a tantalizing hint of patronage at play here based on a letter from Curley to Gilliss dated prior to Gilliss's departure where Curley addressed him as "My very dear Friend" and referred to Gilliss's "dear family," though without mention of Smith. This suggests a possibility of Curley's views on Smith having been shared between these two men of science resulting in Smith receiving his civilian appointment on this multi-year naval voyage. While Smith afterward deemed his "opportunity an unusually favorable one for visiting a country somewhat removed from the ordinary route of tourists," Georgetown stood pleased for making "practical astronomy" mean more than teaching the "use of globes," it meant its students now had entrée to a well-equipped "Astronomical Observatory" where "the practical use of such instruments may be easily communicated to the students."[71]

[71] Curley's aims for his observatory from Curley, *Annals of the Astronomical Observatory, Georgetown College, D.C., No. 1*, preface. Smith's notebook held at GTUA, Observatory Collection, Box 1, Folder 20, student work. Overview about the U.S. Expedition, including Smith's appointment in Wendell W. Huffman, "The United States Naval Astronomical Expedition (1849-1852) for the Solar Parallax," *Journal for the History of Astronomy* 22:69/3

Curley's dedication to teaching made him a favorite instructor with Georgetown's students, being recalled by one graduate as a "dear old man, simple, holy, learned." In contrast Curley made only one real attempt at what could be called astronomical research given the fine instruments at his command which was to determine the latitude and longitude of his new observatory. Aided by Lt. Matthew F. Maury, the first superintendent of the U.S. Naval Observatory to whom Georgetown granted a M.A. degree in 1845, Curley completed his observations in 1846 with his observatory's Ertel and Son transit instrument from which he calculated improved values for the longitude and latitude of Washington, D.C. With the help of Alexander Dallas Bache, then president of the AAAS, Curley published his results in the *Astronomical Journal* in 1850 which brought him and Georgetown to the attention of the American scientific community along with a position on the AAAS American Meridian Committee. He attended annual AAAS meetings from 1854 to 1860, then ceased going as he evidently had no additional research to report given that his priority was teaching and would be until he retired in 1879. If there was any arrogance of science involved with Curley's long life at Georgetown, someone who realized major improvements in the school's teaching of science, it belonged to the AAAS which made no mention of Curley's death in 1889.[72]

(1991), 208-220, 208-220, pg. 211. Personal letter to Gilliss from Curley dated July 10, 1849, in NARA, RG 78 Records of the U.S. Naval Observatory, Box No. PC42 (46-43) E19 HM1994. Gilliss referred to Smith as the "Captain's Clerk," not as one of the expedition's astronomical observers; see James M. Gilliss, *A Catalogue of 1963 Stars . . . from observations made at Santiago, Chili, during the years 1850-'51-'52 by the U.S. Naval Astronomical Expedition to the Southern Hemisphere* (Washington: Government Printing Office, 1870), 5,8. Smith's comment in Edmond Reuel Smith, *The Araucanians: Or, Notes of a Tour Among the Indian Tribes of Southern Chili* (New York: Harper & Brothers, 1855), preface. "Practical Astronomy" was the publicly asserted purpose given during construction of Georgetown's observatory, see "Practical Astronomy," *Daily National Intelligencer*, April 21, 1843, 3. The college course of study as improved by the availability of the observatory described in the year Smith graduated (1848) in "A.M.D.G. Georgetown College, District of Columbia," *Daily National Intelligencer*, September 18, 1848, 4.

[72] Evidence of Fr. Curley's early visibility to the larger American science community appeared in an October 30, 1849 letter from Joseph Henry to Elias Loomis containing a list of names, including Curley's, that Henry and "Dr. Bache" thought appropriate for a "history of the progress of astronomy in the United States;" see Marc Rothenberg (ed.), *The Papers of Joseph Henry* (Washington, D.C.: Smithsonian Institution Press, 1996), 7:611-615, pg. 612.

Georgetown's improved turn toward science instruction through the teaching of a single subject like astronomy showed how the efforts of one individual could put American Catholic higher education on a studier footing. Enrollments remained steady at around 150 students during Curley's early years with the college and would increase twofold by the time of the U.S. Civil War as Georgetown's curriculum grew more attractive to young men. Now, instead of advertisements modestly highlighting the "use of globes" as it had done from the 1810s when Wallace taught astronomy, Georgetown could now boast of an astronomical observatory filled with advanced instruments for student instruction. Pleasing evidence of Curley's labors stood out at the school's 1848 commencement when one of Smith's classmates, John C. Riley, spoke on the "Modern Improvements in Science" and ended his public talk by saying "We may be fully justified in concluding that the human genius is far from being exhausted and, notwithstanding all the past benefits already acquired, we may anticipate still nobler things." For a graduate of a Catholic institution such as John C. Riley, science offered promise and noble prospects for the future, which for Riley turned out to be true as he became a physician and later the dean of National Medical College in Washington, D.C.[73]

Curley remembered in J. Fairfax McLaughlin, *College Days at Georgetown and Other Papers* (Philadelphia: J.B. Lippincott Company, 1899), 97, whose author had received B.A. and M.A. degrees in 1860 and 1862 respectively. Curley acknowledges Maury's numerous assistances throughout Curley, *Annals of the Astronomical Observatory, Georgetown College, D.C., No. 1*. Maury's Master's degree noted in "Georgetown College, D.C.," *Daily National Intelligencer*, July 25, 1845, 2. Curley's result appeared in James Curley, "Note on the Longitude and Latitude of Washington, D.C.," *Astronomical Journal* 1 (1850), 69-70. Regarding the early history of an American meridian, see Matthew H. Edney, "Cartographic Culture and Nationalism in the Early United States: Benjamin Vaughan and the Choice for a Prime Meridian, 1811," *Journal of Historical Geography* 20 (1994), 384-395. While not historical arrogance, for whatever the reason neither Georgetown or Curley receive any mention in Bruce, *The Launching of Modern American Science 1846-1876*. A proper treatment regarding this and other Jesuit observatories appears in Agustín Udías, *Searching the Heavens and the Earth: The History of Jesuit Observatories* (Dordrecht: Kluwer Academic Publishers, 2003), 103-108.

[73] The first newspaper advertisement that I found touting the new observatory appeared in "A.M.D.G. Georgetown College," *Daily National Intelligencer*, September 18, 1848, 4. Riley's commencement talk delivered July 25, 1848, quotation transcribed from manuscript copy found in the GUA. About Riley, see James S. Easby-Smith, *Georgetown University in the District of Columbia 1789-1907: Its Founders, Benefactors, Officers, Instructors and Alumni* (New York: The Lewis Publishing Company, 1907), 2:155.

First Catholic Medical School redux

In contrast to Fr. Curley's individual accomplishments at Georgetown, the reviving of medical education at St. Louis University again involved a group effort by a new company of St. Louis physicians, one led by Dr. Josephus Wells Hall who brought a new medical school constitution before the University's Board of Trustees in October 1841. Like with the school's first attempt in 1836 to create a medical department, the Board quickly gave their assent to a document that included a clause not aimed to elevate the science of medicine, but to reduce potential religious anxieties by picking the new department's twelve trustees from "various religious persuasions" in order to "free the department from all prejudice of a sectarian character," a move suggestive of the board's being alert to growing anti-Catholic or nativist feeling in the state. Also gaining approval were four of the five professorships outlined in the constitution, including one for Dr. Hall who held the chair of "The Theory and Practice of Medicine." This second incarnation of medical education at St. Louis University came alive on March 28, 1842, when Hall presented his first lecture to students and, in celebration of the moment, the general public. By 1845, the school boasted having "eight professors, fifty students, and fourteen graduates."[74]

After several years Hall departed St. Louis University medical school for better prospects whilst other physicians joined its growing faculty, turnover being a common state of affairs for

[74] Board of Trustees Meeting Minutes, St. Louis University, 1833-1857 (typed copy), 43-49. About Hall, see entry from William Stevens Powell (ed.), *Dictionary of North Carolina Biography* (Chapel Hill: The University of North Carolina Press, 1988), 3:11-12, and Sara Aull, *Dr. Josephus Wells Hall: a man of energy and enterprise, Salisbury, North Carolina* (Salisbury: Historic Salisbury Foundation, 1994). Useful overview histories of this medical school in Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 81-88, and from a 1978 lecture by Samuel D. Soule, *Medicine in St. Louis Medical Schools in the Nineteenth Century* (np, 1978), 17-24. More details about Anti-Catholicism in St. Louis and the antebellum west presented in William Barnaby Faherty, "Nativism and Midwestern Education: The Experience of Saint Louis University, 1832-1856," *History of Education Quarterly* 8:4 (1968), 447-458, and in Luke J. Ritter, "Anti-Catholic America: Nativism and religious freedom in the antebellum west," unpublished dissertation, St. Louis University, 2014. Counts of professors, students, and graduates from the *St. Louis Business Directory for 1847* (St. Louis, 1847), 133.

medical schools during this time period when the practice of medicine remained largely unregulated, and there was even less oversight over medical schools. Such was the low esteem in which the public held the medical profession at this time that one historian observed: "Never before had the status of the American medical profession been as low" as in the years before the Civil War. Thus, the medical department and its faculty at St. Louis University remained vulnerable to public opinion, particularly the escalating nativism which would soon cast a dark shadow over the school's long-sought success and productive union with the university. Effective against these problems stood the reputation of the school's medical professors with Dr. Abram Litton one exemplar. When the school's curriculum was reorganized in 1844, Litton became the new Professor of Chemistry and Pharmacy and through his industry within two years "by importations from Germany and France last fall and winter," according to an 1846 newspaper, "the Chemical Apparatus was made equal to any in the west." Another hire was Dr. Charles Alexander Pope as Professor of Anatomy and Physiology. Pope, then in his mid-twenties, had already studied anatomy in Paris before coming to St. Louis and would journey again to Europe in 1846 in order to make "all necessary additions to the Anatomical Museum and Library." Appointed Dean of the medical department in 1847, he and Litton made such contributions that it would be "the teaching of chemistry and anatomy - the two branches for excellence in which this school soon became pre-eminent among its peers in the Mississippi Valley." At a time when many small American colleges had but one professor to teach all the sciences, this medical department within a Jesuit university by 1848 could claim ten physicians providing instruction in the medical sciences and would graduate 18 doctors that year. Here stood no small improvement when it came to Catholic higher education in America.[75]

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[75] General details about Hall and other medical department faculty members found in *Saint Louis Medical Society Centennial Volume*, 236-254. Pre-Civil War American medicine option from Charles E. Rosenberg, *The Cholera*

Yet a festering anti-Catholicism in St. Louis and beyond continued to stalk this medical school, a political ailment its faculty easily recognized and diagnosed. Dr. Moses Lewis Linton, Professor of the Principles and Practice of Medicine and sole Catholic in the medical department, explicitly acknowledged the problem in his "Introductory Lecture" delivered on November 4, 1845. In his talk, Linton railed against those who would turn "to the blind spirit of religious bigotry" in order to destroy his medical department. These difficulties intensified to such a degree during the next ten years that the medical faculty petitioned the university's board of trustees for a separation on two occasions in order to avoid any damage to the university's property or finances as a result of religious prejudice. Although their first request, in 1848, was rejected by the trustees, the second, in 1855, would be granted by the university's president, the Rev. John S. Verdin, S.J. Consequently, despite the medical department's success—by the mid-1850s the number of students had risen to 150 - the university dissolved its association with its medical school and lost this valuable avenue for teaching science.[76]

Years: The United States in 1832, 1849, and 1866 (Chicago: University of Chicago Press, 1962), 154. Litton and Pope specifics from Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 84-85; related quotation about both doctors from *History of the St. Louis Medical College* (St. Louis, MO.: T.G. Waterman, 1898), 4. The 1846 newspaper quotations found in "Medical Department of the St. Louis University," *Palmyra Weekly Whig*, September 17, 1846, 3. Smaller colleges at this time discussed in George H. Daniels, *American Science in the Age of Jackson* (New York: Columbia University Press, 1968), 34-36, esp. 35. Status of the medical department taken from *Annual Announcement of the Medical Department of the St. Louis University* (St. Louis: Chambers & Knapp, 1848), 2, 7-8. Added details about Pope, including his election as President of the American Medical Association, 1854-55, found in Elsworth S. Smith, "Charles Alexander Pope, 1818-1870," *The Washington University Medical Alumni Quarterly* 1:2 (1938), 59-72.

[76] Linton's quotation from M. L. Linton, M.D, *Introductory Lecture delivered in the hall of the Medical Department of the St. Louis University, November 4th, 1845* (St. Louis, 1845), 18. A brief biography about Linton offered in *Saint Louis Medical Society Centennial Volume*, 237-8. In 1848, the St. Louis University trustees "deemed it improper to yield to groundless prejudices" when they first refused the doctor's request; see Board of Trustees Meeting Minutes, St. Louis University, 1833-1857 (typed copy), 70. Overview of the events leading up to the 1855 separation found in Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 95-104.

Another Bachelor of Science Degree

Despite the loss of its medical department, St. Louis University continued to offer instruction in the various sciences through either its time-honored classical or practical commercial curricula, courses of study begun in the 1830s with only the classical leading to a Bachelor of Arts degree. While these curricula underwent some change over the years, or that new scientific apparatus arrived on occasion to help with classroom demonstrations, such as a Holtz's Electrical Machine donated in 1874, only those students who completed the six-year classical course earned a degree. This changed in 1876 for students completing the commercial course who now after four years of study received an "Honorary Certificate" at the annual commencement ceremony. Furthermore, commercial course graduates who then "desire to pursue the study of the Sciences" were "invited to devote one year after their graduation to this object" after which a Bachelor of Science degree would be granted. In 1878, two students from Kentucky, Russell K. Price and Harry D. Wilkes, received the university's first B.S. degrees for studies that, according to the institution's catalog, "prepares students for business, mechanical pursuits, etc."[77]

After graduation Wilkes applied his education as a land surveyor in Colorado for several years, a not surprising pursuit as surveying comprised one subject taught in the commercial course fourth year using the familiar *Elements of Geometry and Trigonometry* text by Davies.

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[77] Rev. Florence Boudreaux, S.J., Professor of Chemistry at St. Louis University, donated this Holtz's machine, see *Catalogue of St. Louis University 1873-74* (St. Louis: Democrat Lithographing and Printing Company, 1874), 4,22. Regarding this apparatus, consult J. H. Pepper, *Electricity: embracing Voltaic, Galvanic, or Dynamical Electricity* (London: Frederick Warne and Co., 1873), 19-21. The first commencement program to list "Honorary Certificate" recipients of the Commercial Course in *Catalogue of St. Louis University 1876-77* (St. Louis: Hayden, Fitzwilliam and Co., 1877), 27, 41, where 11 names appeared as part of their June 27, 1877, event, including Price and Wilkes. The "Course of Science" first detailed as an option of the Commercial Course in *Catalogue of St. Louis University 1877-78* (St. Louis: D.J. Hayden & Co., 1878), 14-15, along with announcing "the degree of S.B." being conferred on Price and Wilkes at the June 26, 1878 commencement. The preparations aspect of the Commercial Course was added in this same catalogue, see page 15.

Returning to his home state of Kentucky to marry, Wilkes then moved to New York City where he enjoyed a long career in business and sales. In contrast, Price seemingly used little from his Bachelor of Science degree for his career as he became a lawyer in Louisville, Kentucky, following in the footsteps of his father. Yet more telling than these outcomes appears to be the reason for St. Louis University offering a Bachelor of Science degree in the first place, that of competition coming from adjacent Washington University whose O'Fallon Polytechnic Institute granted its first B.S. degree in 1866. This science-focused institute had grown such that by 1877 when St. Louis University announced its B.S. degree offering the Institute had expanded to include five more science-linked Bachelor degrees corresponding to the student's professional goals: Civil Engineer, Mechanical Engineer, Chemist, Engineer of Mines, and Architect. Here the O'Fallon Institute's strength to teach these manifold fields descended from possessing an ample faulty numbering 13, including. Dr. Abram Litton, formerly of the St. Louis University medical school, available to teach a student body of just 42 students compared to St. Louis University with 22 faculty, three specifically for a science subject, for a student body 333 in size. Thus, while the offering of a Bachelor of Science degree resulted in a fitting improvement for St. Louis University, it paled in comparison to the academic accomplishments already realized at its urban neighbor Washington University.[78]

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[78] The 1880 U.S. Census shows Wilkes as a "surveyor" living in Ashcraft, Colorado. He is also mentioned working as a surveyor in the early 1880s in Jon T. Coleman, "The Skeletal Shell Game: a history of a Colorado Ghost Town, 1880-present," unpublished M.A. thesis, University of Colorado, 1997, 16. The 1810 Census lists his occupation as a "Com Merch" in the "Tools" industry while his 1923 New York City Municipal Death Record identified him as a "Salesman." Davies shown in *Catalogue of St. Louis University 1877-78*, 15; one possible edition could be Charles Davies, *Elements of Geometry and Trigonometry, with applications in mensuration* (New York: A. S. Barnes & Co., 1875). The 1880 Census situated Price (who died shortly thereafter in 1884) as a "Lawyer" in Spring Garden (near Louisville), Kentucky, where his father was a judge on the Louisville City Court. Washington University produced its first B.S. degree in 1866, granted to Edward Singleton Holden, from *A Catalogue of the Officers and Students of Washington University* (Saint Louis: R. P. Studley & Co., 1867), 52. Washington University O'Fallon Polytechnic details from *A Catalogue of the Officers and Students in the several departments of Washington University with the courses of study for the academic year 1877-78* (Saint Louis: C. R. Barns, Printer, 1877), 65-68, 71. Details about St. Louis University from *Catalogue of St. Louis University 1877-78*, 2-4, 25.

On the other hand, for a Catholic educational institution where "the professors and the majority of the students are members of the Catholic Church," affixing a prescribed "Course of Science" to the school's existing Commercial Course, a course whose enrollments in prior years showed themselves as "rising and falling more readily with general business prosperity," did exhibit an act of faith when it came to teaching science over and above the need to effect any prerequisite religious stance. While this curricular amalgamation leading to a B.S. degree left the Classical course at St. Louis University intact with its own *Ratio*-prescribed science injunctions, it along with the university's rapid attachment and just as sudden detachment of its medical department exposed the trials and adjustments involved in teaching science, even for its dedicated group of Jesuit educators. Notre Dame University, having adopted St. Louis' curriculum design in 1848 after securing its state charter in 1844 authorizing degrees in the liberal arts, sciences, medicine, and law, offers a more deliberate example of 'constant improvement' when it came to teaching science.[79]

Notre Dame finds its way to science

After conferring its first two Bachelor of Arts degrees in 1849, an auspicious year in which "the number of pupils was one-third greater than the previous year," measures helped, in part, by "the acquisition of an [unspecified scientific] apparatus," Notre Dame remained set on to bettering its academic offerings and claimed in 1850 that it had "gradually perfected its various departments" in hope of extending "the sphere of its usefulness." By 1854 the institution's usefulness showed improvements with added rooms that could "now accommodate 250 boarders," the expansion of its teaching faculty from seven to nine professors, including one

[79] The Catholic nature of St. Louis University stated in the *Catalogue of St. Louis University 1877-78*, 7. Analysis of the Commercial Course offered in Walter H. Hill, *Historical Sketch of the St. Louis University: The Celebration of its Fiftieth Anniversary or Golden Jubilee on June 24, 1879* (St. Louis: Patrick Fox, Publisher, 1879), 132.

exclusively devoted to teaching natural philosophy and one part-time for chemistry, and a catalogue that now outlined its six-year collegiate course of studies. No separate commercial course appeared in this catalogue; instead, a student could undertake "a partial course" over two years that afforded a "thorough English and mathematical education, with that complete knowledge of book-keeping, and that fund of general information indispensable to young merchants." In contrast to this 'course' for business, one that made no direct mention of science, this 1854 catalogue revealed a new private class of medicine that would "be opened as soon as any applicants may present themselves." These changes led to the anticipated outcome with the school's enrollment doubling over the years 1850 to 1854 from 56 to 111, and confirmed advertising that boasted "this institution, favorably known to the public for ten years, is now able to offer greater inducements than ever before."[80]

However, these 'inducements' came at a cost in degree production as a mere six more students earned Bachelor of Arts degrees during the 1850s in a decade concurrent to student enrollment rising by 1859 to 185. Moreover, based on premiums awarded at annual commencements held each summer, students garnered only a smattering of science-related awards compared with the regular granting of premiums for their studies of Christian Doctrine, Latin, and Greek. Though degrees and attention to science seemingly worked as lesser inducements, growing enrollments over these ten years spoke highly of the appeal Notre Dame held as a boarding school when in 1859 six of ten students listed their homes as being outside Indiana. Being positioned on "two great trunk lines of railroad" made the school "easily and

[80] Fr. Sorin wrote about this unspecified scientific instrument in 1849, deeming it a reason for "favorable results" in strong enrollments; see Sorin, *Chronicles of Notre Dame du Lac*, 84. The 1850 claim of betterment from *University of Notre Dame du Lac, 1850, South-Bend, Ind.* Improvements by 1854 gleaned from *Catalogue of the Officers and Students of the University of Notre Dame, Indiana, at the beginning of the Academic Year 1854-55*. One example of this boastful advertising was "University of Notre Dame du Lac, St. Joseph County, Indiana," *Daily State Sentinel*, August 25, 1854, 2.

quickly accessible from every part of the country," no doubt a vital feature for Catholic and non-Catholic parents alike in seeking an appropriate institution for their son (and perhaps daughters at nearby St. Mary's College). For here was something up to now unique in American higher education, a vibrant Catholic school that neither overly touted its Catholicism nor markedly promoted science as it developed into a flourishing midwestern academic institution.[81]

Much of the credit for this durable growth belonged to Father Edward Sorin who, since the school opened in 1843, continued serving as Notre Dame's president well into the 1860s as compared to, for example, St. Louis University which operated under six different presidents over the matching span of years. Besides this leadership stability, new academic steadiness appeared, providentially in the sciences, with the 1858 appointment of the Rev. Thomas L. Vagnier as Professor of Chemistry and Natural Philosophy. Under his watch during the 1860s the number of premiums presented in these fields along with a handful in geometry and surveying became more common. Collectively, these structural qualities would sustain Notre Dame through the disruptive Civil War period with little impact on enrollments, aided no doubt by way of its protective northern location away from the main areas of fighting. At the war's end in 1865, student enrollment stood strong at 463 with one notable advancement on that June's commencement program: the awarding of Notre Dame's first Bachelor of Science degree to John Cassidy of Chelsea, Michigan. If this award represented Fr. Sorin exercising Notre Dame's "right to confer all scientific degrees, like all the great colleges in the United States," then the school lagged a decade behind neighboring University of Michigan in Cassidy's home state,

[81] Enrollment and premium statistics assembled from the *University of Notre Dame catalogues* and commencement announcements for years 1850 through 1859. Specific quotations from the *Annual Catalogue of the University of Notre Dame* (Toledo: Pelton, Stewart & Waggoner, 1859), 8. The word 'Catholic' appeared once in this catalogue in the context of the "pleasure that a course of reading in Latin and Greek Patristic literature" would bring (pg. 6).

which had granted its first two B.S. degrees in 1855. Even so, Cassidy's B.S. degree signaled a decisive moment for this Catholic institution and its teaching of science.[82]

Cassidy evidently found science to his liking during his years at Notre Dame as commencement programs confirm his receiving a premium in chemistry and an *accesserunt*, or runner up, award in natural philosophy. After graduating, he remained for at least one more year in order to study the medical arts from the Rev. Louis Neyron who was listed as the school's professor of physiology and geology (while a later source showed him also teaching anatomy and *materia medica*). As a young man in France, Neyron studied surgery and spent time in Napoleon's army where he had ample opportunity to make use of his skills, skills again called into use during the U.S. Civil War. His arrival to Notre Dame in 1864 in Cassidy's last formal year of study made possible not only Cassidy's ability to study medicine, but for the creation of a new medical certificate degree that would prepare students for their eventual entrée to a medical school for the M.D. degree. This was the exact route followed by Cassidy who went on to spend a year at Rush Medical College in Chicago where he received his M.D. degree in 1868, and then returned to South Bend to be Notre Dame's attending physician as well as setting up his own local medical practice. Yet in 1865, both the B.S. degree and medical training offerings went

[82] Vagnier, who was born, educated, and ordained in Indiana, first appeared in the *Fourteenth Annual Catalogue of the University of Notre Dame, Indiana* (Toledo: Pelton, Stewart & Waggoner, 1858). An 1926 obituary for Vagnier given in "Father Vagnier, 68, Dies," *The Notre Dame Alumnus* 5:1 (1926), 9-10. A good overview on Notre Dame and the Civil War is James M. Schmidt, *Notre Dame and the Civil War: Marching Onward to Victory* (Charleston, SC: History Press, 2010). The 1865 catalogue listed 12 pages of students in attendance along with details about the June 22, 1865, commencement ceremony; consult *Twenty-First Annual Catalogue of the Officers and Students of the University of Notre Dame, Indiana, for the beginning of the Academic Year 1864-65* (Notre Dame: Office of the "Ave Maria", 1865). Sorin's quotation from his letter to Father General Boreau in France dated November 8, 1843, see O'Connell, *Edward Sorin*, 141. All of the Michigan degrees of 1855 listed in *University of Michigan: Catalogue of Graduates, Non-Graduates, Officers, and members of the Faculties 1837-1921* (Ann Arbor: Published by the University, 1923), 57-58.

unspoken in the school's annual catalogue, deficiencies soon corrected as Notre Dame plainly became a place of science.[83]

In 1866 while Cassidy pursued his informal studies with the Rev. Neyron, Notre Dame published an updated annual catalogue with details about its "degrees of Bachelor of Science and of Master of Science" available through a six-year "Scientific Course" of study. Much like Santa Clara's B.S. degree curriculum, this course copied the school's existing B.A. syllabus, but substituted French for Latin and Greek while adding extra science subjects such as astronomy and geology. A year later two more B.S. degrees would be conferred along with the first officially revealed "Medical Certificate" to Thomas L. Oldshue of Pittsburg, Pennsylvania. Concurrent to these events was a welcomed impulse to science instruction at Notre Dame in the person of Father Joseph C. Carrier, another French-born immigrant who earlier studied natural philosophy and received a *Licentiate* of science before coming to America. He augmented Father Vagnier efforts in teaching science and in May 1868 established the United Scientific Association for the "prosecution of scientific researches" in natural history, physics, and mathematics with an initial 17 members. Moreover, Carrier arranged for the gifting of a 6-inch refracting telescope from French Emperor Napoleon III which brought widespread notice to the

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[83] Cassidy's awards from the June 22, 1864, commencement, see *Twentieth Annual Catalogue of the Officers and Students of the University of Notre Dame, Indiana, for the beginning of the Academic Year 1863-64* (Philadephia: James B. Chandler, 1864), 20. Cassidy was still listed in the catalogue for the school year after he received his B.S. in 1865 in *Twenty-Second Annual Catalogue of the Officers and Students of the University of Notre Dame, Indiana, for the beginning of the Academic Year 1865-66* (Notre Dame: "Ave Maria" Press, 1866), 21. Details about Neyron and his fascinating life in France and the U.S. presented in Notre Dame student newspaper, see "Rev. Louis Neyron," *The Notre Dame Scholastic*, January 14, 1888, 264-267. Cassidy listed as a 1867-68 graduate from Rush Medical College as noted in *Twenty-sixth Annual Announcement of Rush Medical College, Chicago, Illinois, for the session of 1868-1869* (Chicago: Church, Goodman & Donnelley, 1868), 15. Based on the graduation requirements stated in this announcement (p. 5), Cassidy evidently satisfied the required three years of total medical study between time at Notre Dame and courses of lectures at Rush. The student/teacher connection of "Doctor J. Cassidy, another medical student of Rev. Father Neyron," as well as the visibly standing of medicine in general noted in Notre Dame student newspaper, "Surgery and Medicine," *The Scholastic Year*, April 4, 1868, 3. A short biography of Cassidy ca. 1880 appeared in *History of St. Joseph County Indiana*, 903-4, which noted his religion as Roman Catholic. He died on April 5, 1917, an obituary spoke of his being "a physician here [South Bend[for the last fifty years," see "Indiana Deaths," *Indianapolis News*, April 6, 1917, 20.

university as well as fostering student interest in the science of astronomy. Thus, in the course of just a few years and through the efforts of Vagnier, Carrier, and Neyron, Notre Dame University possessed an admirable and productive culture of science, an improvement which credibly extended its "the sphere of its usefulness" to make this institution stand out among its Catholic peers for years to come.[84]

In twenty-five dynamic years, Notre Dame had developed an attractive curricular repertoire and evident reputation in science that not only served as an obvious inducement to potential students but made the school itself a potential resource useful to other Catholic educators seeking help in running their schools as well. As early as 1844 the Rev. Sorin, the visible head of the Congregation of Holy Cross in the region, had been contacted by other dioceses for teaching staff or, in the case of one ambitious Iowa bishop, assistance in setting up his own competing institution for training local vocations for the priesthood. Sorin turned down this request as he did an 1865 offer to take over the recently closed Sinsinawa Mound College in

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[84] The B.S and M.S degrees appeared as an added new short paragraph in *Twenty-Second Annual Catalogue of the Officers and Students of the University of Notre Dame, Indiana, for the beginning of the Academic Year 1865-66*, 9. Details of the Scientific Course on pgs. 14-15 while John Cassidy remained listed as a student on pg. 21. The next two B.S. degrees and first Medical Certificate presented at the June 26, 1867, commencement detailed in *Twenty-Third Annual Catalogue of the Officers and Students of the University of Notre Dame, Indiana, for the academic year 1866-67* (Notre Dame: "Ave Maria" Press, 1867), 36-37. Prior to studying at Notre Dame, Oldshue spent a short time at Georgetown University without taking a degree; after Notre Dame he gained a M.D. degree in 1871 from the highly problematic Philadelphia University of Medicine and Surgery, a school suspected to be a reputed "Bogus Diploma Business" according to "The Bogus Diploma Business," *Medical and Surgical Reporter* 28:12 (1873), 254-255. Life details about Oldshue available in *Biographical Review, containing life sketches of leading citizens of Pittsburgh and the vicinity, Pennsylvania* (Boston: Biographical Review Publishing Company, 1897), 24:64-65. A generous history regarding Rev. Carrier appeared in *A Brief History of the University of Notre Dame du Lac Indiana*, 119-122; also see *History of St. Joseph County Indiana*, 530; the school's newspaper reported his death in "Death of Father Carrier, C.S.C.," *Notre Dame Scholastic*, November 19, 1904. Regarding the 'Napoleon Telescope' as it came to be known, an instrument "valued at 25,000 francs," multiple newspaper articles appeared announcing this news; for one example see "Minor Topics," *New York Times*, June 4, 1867, 4. This proto-medical faculty evolved into a fully-fledged Department of Biology, an overview of that history found in Theodor Just, "A Brief History of the Department of Biology, University of Notre Dame," *Proceedings of the Indiana Academy of Science Sixty-First Annual Meeting* 55 (1945), 147-153. With no little surprise when it comes to histories about American Catholic higher education, there is no mention of Notre Dame's efforts to teach medical arts in Burton Dorr Myers, *The History of Medical Education in Indiana* (Bloomington: Indiana University Press, 1956).

Wisconsin, an institution founded in 1846 for males and run by the Dominican order, choosing instead to follow his bishop's advice to "do all you can to put Notre Dame on a good and secure footing." However, had Sorin looked closer at these two opportunities, he would have discerned these institutional projects shared a common promoter for education: "one priest, a zealous Dominican, Samuel Mazzuchelli, [who] ministered to a scattered population of less than 3000."[85]

What one young Italian priest could do in Wisconsin

Motivated in his youth to help propagate the faith, twenty-one-year-old Dominican Friar Samuel Mazzuchelli left his home in Italy in 1828 to undertake just that mission where he chose to work in the struggling Catholic missions in America. This ambition conveyed him first to Cincinnati, Ohio, where another Dominican, Bishop Edward Fenwick, arranged Mazzuchelli's final training before ordination, a year well spent as it gave the young Italian time to learn English. Following his ordination in November 1829, Mazzuchelli continued to serve Ohio Catholics while Fenwick thought where to place his newly ordained priest. In September 1830 Fenwick made his decision: Mazzuchelli would be assigned to serve the long-neglected Catholics in the Territory of Michigan and upper Mississippi Valley.[86]

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[85] The 1844 request to Sorin from Bishop Mathias Loras of the Dubuque Diocese receives attention as does the 1865 Sinsinawa Mound College offer in O'Connell, *Edward Sorin*, 152-3 and 521-2 respectively. Quotation from 1865 letter of advice from Sorin's bishop, Rev. John Henry Luers, from pg. 522 of the same source, original held in the Archives of the Indiana Province of the Congregation of Holy Cross. Rev. Mazzuchelli portrayal from entry on *Archdioceses of Dubuque* in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 5:179-81, pg. 179.

[86] Mazzuchelli's life from growing up in Italy up to his missionary beginnings is told in Mary Nona McGreal, O.P., *Samuel Mazzuchelli American Dominican: Journeyman, Preacher, Pastor, Teacher* (Notre Dame, IN: Ave Maria Press, 2005), chapters 1-4. Further details available in an English translation of his 1843 memoir, Samuel Charles Mazzuchelli, O.P., *Memoirs: historical and edifying, of a missionary apostolic of the order of Saint Dominic among various Indian tribes and among the Catholics and Protestants in the United States of America* (Chicago: W. F. Hall Printing Company, 1915).

With undeniable zeal Mazzuchelli spent the next decade serving the few faithful scattered across this vast field as well as preaching to and pursuing conversions of Menominee, Chippewa, Sioux, and other Native Americans along with the occasional Protestant. As far as higher education was concerned, his efforts were limited to acting as an agent for St. Louis University by directing any potential students to that Jesuit institution to the south on the Mississippi River. Starting in 1839 Mazzuchelli taught occasionally at a seminary attached to the church of Bishop Mathias Loras in Dubuque, Iowa, a struggling venture that quietly survived even after Father Sorin at Notre Dame failed to lend any aid in 1844. Yet education remained an obvious need and by 1846 Mazzuchelli had come to think that "after preaching, the schools under the direction of the clergy are the most powerful means for the propagation of the faith," so he set about to pursue just that on 800 acres of recently purchased land, a place well known as the Sinsinawa Mound in the southwest corner of the Wisconsin Territory. By way of comparison with the Jesuits and their schools in America, he wrote his superiors in Rome seeking their support for this endeavor arguing "I do not see why the sons of St. Dominic could not do as much . . . ."[87]

Educating a son of St. Dominic long stressed theology over secular knowledge given the order's emphasis on its preaching mission, a priority that would have held true with Mazzuchelli for his initial education at Santa Sabina in Rome and later training in Ohio. Given this background, the announcement of Sinsinawa Mound College which Mazzuchelli placed in the *Catholic Almanac for 1847* unsurprisingly made no direct mention of science, only that "All

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[87] McGreal, *Samuel Mazzuchelli American Dominican: Journeyman, Preacher, Pastor, Teacher*, chapters 4-8 give full measure to his missionary efforts from 1830 until the mid-1840s when founding a school in Wisconsin became his priority as outlined in chapter 10. Mazzuchelli recalled the "Conversion of a young Protestant" in Mazzuchelli, *Memoirs*, chapter 39, 292-294. Mazzuchelli as agent for St. Louis University noted in Garraghan, *The Jesuits of the Middle United States*, 3:216-217. The 1844 Loras/Sorin affair is retold in chapter 3 of M. M. Hoffmann, *The Story of Loras College 1839-1939* (Debuque: Loras College Press, 1939), 52, along with the early history of St. Raphael, Loras' seminary. His irregular teaching at St. Raphael's told in Marie M. Hoffmann, "St. Raphael's Seminary," *The Palimpsest* 20:6 (1939), 196-206. Quotations from Mazzuchelli's January 29, 1846, letter to Vincenzo Ajello who was the Dominican Master of the Order, on pg. 209; original in Sinsinawa Dominican Archives.

branches of education taught in the other colleges of the United States will be taught in this institution." But this initial impulse to simply mirror current American college curricula did not last long as Mazzuchelli, perhaps influenced by the success of Notre Dame and St. Louis, pushed forward in 1848 the call to teach science when Sinsinawa Mound College became the first institution of higher learning in the Territory of Wisconsin to incorporate "on a plan sufficiently extensive to afford instruction in the liberal arts and sciences." This swiftly led to newspaper notices making explicit mentions of natural philosophy, chemistry, mathematics, and other subjects to be taught as part of the school's six-year curriculum. Then, after having brought about this sharper focus on teaching of sciences, Mazzuchelli vacated his position as college president in the fall of 1849 to return to his preaching and placed Sinsinawa Mound College in the hands of Dominicans from the St. Rose seminary in Kentucky who retained, but did not appreciably improve, the place of science in this school. The college endured through the 1850s despite being reported as "not in a very flourishing condition" with a "not large" number of students. These struggles lingered into the 1860s as the Civil War began where the college's 1862 circular spoke of "the hardness of the times," listed only a few faculty while noting "arrangements will be made to secure the services of other efficient faculty," but did announce the conferring of three B.A. degrees and a lone science premium in chemistry. Matters were such that toward the last years of the war Sinsinawa reached out to Father Sorin at Notre Dame asking assistance from his order in running the school. When Sorin declined to help in 1865, Sinsinawa ceased operation, an inopportune outcome given Sinsinawa's early promise in science just as Notre Dame was coming into its own when it came to teaching this subject.[88]

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[88] A basic introduction about Dominican education provided by Philip Smith, O.P., "A Dominican Philosophy of Education," in Gabrielle Kelly, et al. (eds.), *Dominican Approaches in Education: Towards the Intelligent Use of Liberty*, Second Edition (Adelaide: ATF Press, 2014), 3-18, esp. pgs. 8-9. Under the Diocese of Milwaukee entry, Sinsinawa Mound College publicized in *The Catholic Almanac for 1847* (Baltimore: Murphy, Printer, 1847), 187-

In parallel to Mazzuchelli starting Sinsinawa Mound College in 1847 for the education of males, he also worked to establish a convent at the same location which the *Catholic Almanac for 1847* described "as yet in its infancy." Within a year the convent's three sisters formally incorporated themselves for "educational purposes" under the name Sinsinawa Female Academy that allowed them to offer limited teaching help at local schools. In 1852 the convent's four members moved east about ten miles from Sinsinawa Mound to the Wisconsin town of Benton where Mazzuchelli had been assigned as pastor. Here they opened St. Clara Academy for young girls, an institution that would offer instruction at the secondary school level with Mazzuchelli as one of its teachers giving weekly lectures on "Holy Scriptures, Astronomy, Rhetoric, and Natural Philosophy." He enhanced these scientific talks using teaching apparatus ordered and shipped overland from New York City including a telescope, an electrostatic generator with many accessories, a pair of small globes, and other teaching items. Accounting records from 1854 to 1858 reveal that some pupils procured textbooks embracing "higher mathematics and the sciences" to complement the lectures given by Father Mazzuchelli. Such was the space made for science at this school where he could teach and minister to Sisters and students alike within his ascribed ministry, no doubt a gratifying amalgam of religious duties not possible when he was posted in Dubuque or at Sinsinawa Mound. When Teresa Hood of Mineral Point spoke in 1855 at the school's second annual commencement of being "proud of numbering among our teachers

188. The college incorporating approval from *Laws of Wisconsin Territory, passed by the Legislative Assembly, at the session thereof commenced in February, A.D. 1848* (Madison, W.T.: H. A. Tenney, Territorial Printer, 1848), 206-208. News of this new school with a portrayal of science and other subjects quickly reached Philadelphia, see "Sinsinawa Mound College, Wisconsin," *The Catholic Herald*, January 18, 1849, 7. Mazzuchelli going back to preaching explained in McGreal, *Samuel Mazzuchelli American Dominican: Journeyman, Preacher, Pastor, Teacher*, 222-223. The condition of the college in 1858 appeared in "From our Traveling Correspondent," *Wisconsin Daily State Journal*, October 5, 1858, 2. The 1862 document mentioned is the *Descriptive Circular of Sinsinawa Mound College, Wisconsin, 1862* (Dubuque: Hearld Book and Job Printing House, 1862). Recall from my chapter 1 the history of a failed Dominican school at St. Rose, Kentucky, where science also failed to make a strong appearance.

the Rev. Father [Mazzuchelli]," he in response no doubt felt equally proud when this young student went on to state that "to know God is to know the essence of all truths and of all sciences."[89]

Mazzuchelli fosters women's education in Wisconsin

By the end of the 1850s enrollment at Saint Clara Academy had grown to 70 as science remained an active part of academic life inside the classroom and outside at the annual exhibitions as when in July 1859 the two Power sisters, Catharine and Anastasia, "were called out to treat on Natural Philosophy" for an audience numbering "about three hundred people." St. Clara found the small town of Benton to be a workable location, thus academy Prioress Joanna Clark reincorporated the institution in 1862 under the revised name "Benton Female Academy," a change approved by the Wisconsin legislature again for "educational purposes." Then just two year later the unthinkable happened when Father Samuel Mazzuchelli died on February 23, 1864, at age 57. While he "had given 33 years of his life to the cause of religion and the diffusion of knowledge in the west," out of his passing would come a renewed commitment from the 23

[89] *The Catholic Almanac for 1847*, 187. Incorporation noted in *Laws of the State of Wisconsin, together with the Joint Resolutions and Memorials passed by the Legislature at the First Session* (Madison: Rhenodyne A. Bird, 1848), 149-150. The founding of St. Clara Academy and its Dominican Sisters in general well discussed in McGreal, *Samuel Mazzuchelli American Dominican: Journeyman, Preacher, Pastor, Teacher*, chap, 11, esp. pgs. 231-237, which mentions the arrival of Mazzuchelli's instruments "by riverboat and oxcart." Based on surviving instruments and notes at today's Dominican Motherhouse at Sinsinawa Mound, this apparatus appears to have been ordered from the two volume Benjamin Pike, Jr., *Pike's Illustrated Descriptive Catalogue of Optical, Mathematical, and Philosophics Instruments* (New York: Published and sold by the author, 1848). Lectures by Mazzuchelli given in "St. Clara Female Academy, Benton, Lafayette Co., Wis.," *Mineral Point Tribune*, July 4, 1855, 3. Textbooks at the school and their subjects discussed in J. D., et al., *Golden Bells in Convent Towers: The Story of Father Samuel and Saint Clara 1854-1904* (Chicago: Lakeside Press, 1904), 75. Miss Hood, estimated to be 15 years old based on 1850 U.S. Census records, had her commencement address printed in "Second Annual Commencement of St. Clara Female Academy, Benton, Wisconson," *Mineral Point Tribune*, September 11, 1855, on its first page. More details about Mazzuchelli delivering instruction in the sciences at St. Clara given in Sister Mary Paschala O'Connor, O.P, *Five Decades: History of the Congregation of the Most Holy Rosary, Sinsinawa, Wiscoson, 1849-1899* (Sinsinawa, Wisconsin: The Sinsinawa Press, 1954), 47,57-59.

professed Sisters that made up the convent and its school to keep Benton Female Academy open.[90]

Not only did this Dominican female academy stay open, its legacy of teaching science remained intact as the school gained possession of Mazzuchelli's natural philosophy teaching instruments, objects treasured for their classroom utility and as a constant reminder of his efforts on behalf of the Sisters and their school. In 1865 when Sinsinawa Mound College for males ceased operation and the land sold, the Sisters boldly decided to sell their Benton location in order to purchase the lands of the Mound, a move giving them an improved location and protection from competition by other groups thinking of instituting a school in the area. On September 3, 1867, the academy opened at Sinsinawa Mound with 115 girls enrolled to follow an advertised curriculum in which "it is impossible for the intellect not to make rapid strides up the 'Hill of Science.'" The school noted that its "scientific departments receive most careful attention" in addition to possessing an "extensive cabinet of philosophical apparatus, a fine set of globes, terrestrial and celestial, and a powerful telescope." Here was a fitting epilogue for Father Mazzuchelli who had brought about this modest constant improvement of teaching science after decades of laboring in the southwest corner of Wisconsin.[91]

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[90] Both Saint Clara Female Academy and Sinsinawa Mound College claimed 70 students though the college had been opened longer, see *Dunigan's American-Catholic Almanac 1859* (New York: E. Dunican & Brother, 1858), 185-186. The Power sisters mentioned in an 1859 *National Democrat* newspaper article from Dubuque, Iowa, for the July 30, 1859 exhibition, quoted from O'Connor, *Five Decades: History of the Congregation of the Most Holy Rosary, Sinsinawa, Wiscoson, 1849-1899*, 59-60. The 1862 act to reincorporate Saint Clara published in *Private and Local Laws passed by the Legislature of Wisconsin in the year Eighteen Hundred and Sixty-two* (Madison: Smith & Cullation, 1862),70. Quoted comment about Father Mazzuchelli when he passed away in "News from Dixie - Extracts from Rebel Newspapers," *Wisconsin State Journal*, March 4, 1864, 2. Full description about the circumstances of his death in *Five Decades*, 62, 100-104.

[91] Ownership of Mazzuchelli's property was facilitated as a member of the convent, Sister Josephine, was appointed administrator of his estate, see *Five Decades*, 104. From the same source comes a discussion of the decision to sell the school's property in Benton in order to buy the Sinsinawa Mound lands and buildings, see pgs. 116-123; date of opening in the new location on pg. 123 also. Mention of the "Hill of Science" and science curriculum description in *Thirteenth Annual Catalogue of Saint Clara Academy, Sinsinawa Mound, Grant Co., Wis.* (Galena: Gazett Book and Job Office, 1867),4. In 1868 the Sisters reincorporated the school to again become "Saint Clara Female Academy,"

Science again goes north in Minnesota

Thick with trees and immigrant Catholics, the lands west of the Mississippi River in the Territory of Minnesota during the 1850s became home for a new school instituted under the auspices of the Benedictine Order. Incorporated in early 1857 through the approval of the Territorial Legislative Assembly, the stated goal was "to establish a scientific, educational and ecclesiastical institution" to be called St. John's Seminary, though it quickly became known as St. John's College to those living in the recently established St. Paul Diocese. The 'college' opened in November 1857 near the town of St. Cloud with a lone professor and five students residing in a "primitive log building about 12x20," and with only a "few books." Over the next ten years the school would be run by a series of Benedictine Priors and serve a trickle of students it being the only Catholic school in the state. It was a decade of scarce funds, no formal curriculum, Indian rebellions, and land ownership squabbles. Other than gaining a foothold, St. John's provided a basic educational opportunity for young boys in "the heart of the Indian Bush," no more.[92]

In 1867 major improvements to this school's situation began with "the elevation of the St. Cloud priory to an abbey" with the Very Rev. Rupert Seidenbusch elected its abbot. Seidenbusch wasted no time in assembling eight professors who would teach a formal curriculum that included, as far as science was concerned, basic arithmetic and geometry. Also, for the first time, advertisements titled "St. John's College" appeared in regional newspapers that

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see *Private and Local Laws passed by the Legislature of Wisconsin in the year 1868* (Madison: Atwood & Rublee, 1868), 199.

[92] St. John's incorporation document and these other useful details come from Alexius Hoffmann, O.S.B., *St. John's University, Collegeville, Minnesota: A Sketch of its History* (Collegeville: Record Press, 1907), 5, 7, 8, and 14. For the history of the St. Paul Diocese, see Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 13:366-369, a diocese that covered "some 166,000 square miles." A general history of the Benedictines in this region provided by Vincent Tegeder, O.S.B., "The Benedictines in Frontier Minnesota," *Minnesota History* 32:1 (1951), 34-43.

summer, sans any description of the curriculum or admission requirements, regarding the school's planned opening on September 2. These efforts paid off when 51 students enrolled to pursue either a classical course of studies as endorsed under the foundational *Regula Benedicti*, or Rule of Benedict, or courses adapted to the American setting such as commercial book-keeping. Surprisingly, teaching of science had no visibility in this makeover given its persistent emphasis at other American Catholic institutions so far discussed. Although this nonappearance undercuts the sincerity of St. John's wanting to be a "scientific" institution as stated in its original incorporation document, this absence comes as no surprise given the school's need to serve an isolated local community, one that lacked that the funds to purchase "every kind of scientific apparatus, such as they may deem expedient for the object of said institution" as the 'college' had at first hoped.[93]

Detectable progress in science instruction did not appear at the close of Seidenbusch's first year based on the awards given out at St. John's first annual examination held in June 1868; only in elementary subjects like Christian Doctrine, the dead languages, grammar, etc., were accolades distributed, although a trio of students all earned honors in algebra and geometry. However, in 1869 awards bestowed included one in Natural Philosophy for the first time, not surprisingly to one of the mathematics winners from the prior year, William Brennan of Chatfield, Minnesota. Earlier that same year St. John's requested and received State legislative approval to "have the power to confer such degrees and grant such diplomas" as customary at

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[93] Additional details about St. John's from Hoffmann, *St. John's University, Collegeville, Minnesota: A Sketch of its History*, 16-21. A late August newspaper advertisement for the school found in "St. John's College," *The St. Cloud Journal*, August 29, 1867, 2. About Benedictines needing to adjust to American needs, see Joel Rippinger, O.S.B., "Adapting Benedictine Monasticism to Nineteenth-Century America," *U.S. Catholic Historian* 3:4 (1984), 294-302, pg. 302. Concerning the *Regula Benedicti*, refer to Timothy Fry, O.S.B. (ed.), *RB 1980 : the rule of St. Benedict in Latin and English with notes* (Collegeville, Minn.: Liturgical Press, 1981); about their application in the nineteenth-century American context, see Marielle Frigge, O.S.B., "Ancient Way in a New Land: Benedictine Education in the Great Plains," *Great Plains Quarterly* 34:4 (2003), 231-244. The 'every kind of scientific apparatus' aspiration was stated in Section 6 of St. John's original 1857 incorporation document.

other universities and colleges, a power first invoked in June 1870 when five B.A. degrees were conferred. Brennan needed one more year of study before receiving his own B.A. and remained the only St. John's student to have garnered a commencement award in a science subject to that point, most likely indicative of the school not being able to offer anything more for him to study. Yet the school did make good use of his mathematical talent as it listed him as a "Professor of Arithmetic" for his last two years, unfortunately this teaching that did not turn into a calling as Brennan would become an ordained Catholic priest in 1872 who served in a number of towns across Minnesota for the next 30 years until his death in 1902. No matter, Brennan's time at St. John's bolstering mathematic instruction might have impacted at least one student, a 13-year-old Peter Engel who enrolled in 1869 from nearby St. Michael, Minnesota, later recalling "I had at that time no clear idea about my vocation." Engel would find his vocation at the college and, in turn, help to make St. John's a place for science.[94]

During Engel's seven years as a student at St. John's from 1869 to 1876, he amassed an assortment of commencement awards and credentials such that ascertaining his definite 'vocation' would be challenging. From language premiums in Latin, Greek, French, and German to practical awards for arithmetic and bookkeeping along with Christian Doctrine to the simple pleasures of drawing and music, all combined these make his one "distinguished" natural philosophy award seem out of place. Yet science in addition to religion proved to be his passion

[94] Details of St. John's commencements for 1868 and 1869 found in Francis Mershman, O.S.B., D.D., *First Annual Catalogue of St. John's College 1867-1868 (compiled from various sources)* ([Collegeville]: University Press Print, 1894) and Francis Mershman, O.S.B., D.D., *Second Annual Catalogue of St. John's College 1868-1869 (compiled from various sources)* ([Collegeville]: University Print Press, 1894). Details for 1870 and 1871 from *Catalogue of the Officers and Students of St. John's College for the Academic Year 1870* (St. Paul: Office of "The Wanderer", 1870) and *Catalogue of the Officers and Students of St. John's College for the Academic Year 1871* (St. Paul: Office of "The Wanderer", 1871). About life history of William Brennan see short entry in *Collections of the Minnesota Historical Society, Volume XIV: Minnesota Biographies 1655-1912* (St. Paul: Minnesota Historical Society, 1912), 75. Engel's recollection and other details in Colman J. Barry, O.S.B., *Worship and Work: Saint John's Abbey and University 1856-1956* (St. Paul: North Central Publishing Company, 1956), 224.

when after receiving a "Master of Accounts" diploma in 1874, making his "simple vows" in 1875, and receiving his Bachelor of Arts in 1876, St. John's now secured a new "Professor of Natural Philosophy and Bookkeeping." After two further years of religious preparation at St. Vincent's College in Latrobe, Pennsylvania, which was the home institution for the American Benedictines, and where Engel enjoyed "a few months" to study chemistry and physics with one of the school's learned Benedictines, he would be ordained on December 15, 1878. Returning to St. John's to begin what would be a life's work at this school as a teacher and administrator, Engel contributed to improvements at the college by way of stable teaching of physics and chemistry, creation of a museum, and building a collection of scientific apparatus. Thus the St. John's 1883-84 catalogue could announce that "religion and science" were being cultivated "in our young Northwest," a status confirmed in the 1884 report by the U.S. Commissioner of Education that "St. John's College [offers] special scientific courses." In less than three decades, the Benedictines had realized their aspiration "to establish a scientific, educational and ecclesiastical institution."[95]

Success and failure in Philadelphia

Whereas Mazzuchelli and Engel enjoyed solid support from their bishops in starting and running their schools in the rural upper Mississippi Valley region, Philadelphia Bishop Francis P.

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[95] Self-authored details and insights by Rev. Peter Engel from birth to ca. 1894 found in Barry, *Worship and Work: Saint John's Abbey and University 1856-1956*, 224-225; further information in the *Saint Cloud* entry from Edward A. Pace, et al. (eds.), *The Catholic Encyclopedia, Supplement 1, Volume XVII* (New York: The Encyclopedia Press, Inc., 1922) 652-653. Engel's Master of Accounts listed in the *Seventh Annual Catalogue of the Officers, Faculty and Student of St. John's College for the academic year 1873-74* (St. Cloud: Office of the St. Cloud Journal, 1874), 13, while his status as faculty member and being granted a Bachelor of Arts degree received notice in *Ninth Annual Catalogue of the Officers, Faculty and Student of St. John's College for the academic year 1875-76.* (St. Paul: The Pioneer-Press Company, 1876), 11 and 12 respectively. "Religion and Science" standing stated in *Seventeen Annual Catalogue of the Officers, Faculty and Staff of St. John's University* (St. Paul: The Pioneer Press Company, 1884), 5. The institution's becoming a university explained on page 5 that "By an act of the [Minnesota] Legislature approved February 17, 1883, the name St. Johns Seminary was changed into that of St. Johns University." The 1884 mention of scientific course in *Report of the Commissioner of Education for the year 1882-83* (Washington: Government Printing Office, 1884), Abstracts section, pg. 138.

Kenrick first needed to impose his authority over a resistant laity essentially in charge of the city's churches and few schools before any new ones, let alone colleges, could be attempted. Five years after his appointment in 1830 his efforts to initiate Laurel Hill College failed, but the Augustinian College of Villa Nova and St. Joseph's College, established in 1842 and 1851 respectively, won footholds in what must have been a satisfying prologue that foreshadowed the 1869 newspaper article cited at the opening of this chapter applauding "constant improvement." Villanova found steady progress by offering a curriculum "classical and scientific" initially to Catholics only, securing a charter in 1848, then awarding its first B.A. degrees in 1855 to James F. Dooley and Henry C. Alexander in a commencement ceremony featuring Alexander speaking on "Physical Science." For the Jesuits who were given charge of St. Joseph's, this long-awaited school in America's second largest city not only pleased them, but Bishop Kenrick as well, though this fledgling institution seemed more intent initially on teaching "the elementary branches of education, together with the sciences and modern and ancient languages" as indicated in the institution's 1852 charter. "The wonder is that such a work was deferred so long."[96]

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[96] How Kenrick came to be assigned to Philadelphia to solve 'The Philadelphia Problem' discussed in great detail in Hugh J. Nolan, *The Most Reverend Francis Patrick Kenrick, Third Bishop of Philadelphia 1830-1851* (Philadelphia: Walther Printing House, 1948), 61-101. This question and Kenrick's impact on Catholic education in Philadelphia further assessed in Dale Light, "The Reformation of Philadelphia Catholicism, 1830-1860," *Pennsylvania Magazine of History & Biography* 112:3 (1988), 375-405, esp. 399-400. The Laurel Hill College failure was discussed earlier in this chapter. Villanova's 1848 charter with his name then spelled as "Villa Nova" found in *Laws of the General Assembly of the Commonwealth of Pennsylvania passed at the session of 1848* (Harrisburg: J. M. G. Lescure, 1848), 132-133. That a "scientific" course existed along with the college being open only to Catholics declared in an 1844 newspaper advertisement, see "St. Thomas of Villanova's College," *New York Freeman's Journal*, June 8 1844. The institution's first B.A. degrees in 1855 described in Rev. Thomas C. Middleton, *Historical Sketch of the Augustinian Monastery, College and Mission of St. Thomas of Villanova, Delaware County, PA., during the first half century of their existence, 1842-1892* (Philadelphia: D. J. Gallagher & Co., 1983), 39-40. A more current history of the school offered by David R. Contosa, *Villanova University, 1842-1992: American - Catholic - Augustinian* (University Park: Pennsylvania State University Press, 1995). St. Joseph's College charter found in *Laws of the General Assembly of the Commonwealth of Pennsylvania passed at the session of 1852* (Harrisburg: Theo. Fenn & Co., 1852), 16-17. As a work long deferred remarked in a memorial to one of the college's former Jesuit administrators, see Fr. E. I. Devitt, "Father James A. Ward: A Sketch (concluded)," *Woodstock Letters* 26:2 (1897), 201-212, pg. 204.

Wonder aside, this school soon found itself struggling with the considerable debt incurred from property purchases, construction, and fitting up of classrooms for the two locations occupied by the developing college from 1851 through 1860, first on Willing's Alley and then at Filbert and Juniper Streets. Propelled by the need to address a decades-old absence of a Catholic college in Philadelphia proper, the Jesuits found themselves, their Order, and Bishop Kenrick encouraging about opening a place of higher learning, even Kenrick's successor, Bishop John Neumann told his superior that "Divine Providence has intended this location for a college" with respect to the Filbert and Juniper Streets situation. While St. Joseph's did make a modest nod toward teaching natural philosophy along the way to awarding its first B.A. degree in 1858 to Constantine Lippe who went on to become a physician in the city, no amount of science teaching would rescue this faltering school. In 1860 it had to retreat to its prior less attractive Willing's Alley location and by 1863, according to one of its former students, "the college fell into a torporous sleep." It generates little surprise then that St. Joseph's College failed to be listed as one of the improved Philadelphia Catholic colleges in my chapter's prefatory *Catholic Standard* newspaper article.[97]

Again, the push to establish a functioning Catholic college in Philadelphia came from the city's bishop, Bishop James F. Wood who took over after Bishop's Neumann's sudden death in 1860, when in 1862 he approached the Christian Brothers order to magnify their existing high

[97] St. Joseph's painful growth discussed in Francis X. Talbot, S.J., *Jesuit Education in Philadelphia: Saint Joseph's College 1851-1926* (Philadelphia: Sait Joseph's College, 1927), mainly chapters 2-4. Neumann's quotation from a letter dated September 21, 1857, quoted from Talbot, pg. 64. Lippe's graduation noted in Talbot, pg. 59, and in the prior year received a premium in natural philosophy at the college's July 7 commencement, see "St. Joseph's College," *Catholic Herald*, July 18, 1857. After serving in the Union Army, Lippe received his M.D. degree in 1866 from Homeopathic Medical College in Philadelphia in a ceremony described in "City Bulletin - Homeopathic Medical College," *The Daily Evening Bulletin*, March 1, 1866. St. Joseph's somnolent state recalled by former student Charles H. A. Esling, quoted in Talbot, pg. 72, original 1901 document, "Reminiscences of St. Joseph's College, Philadelphia, 1854-1863," held in St. Joseph's University Archives.

school into a college. Having provided teaching services in Philadelphia since 1853, this order agreed to this request by promptly seeking a state charter and within a few years moving into the same building surrendered by the Jesuits of St. Joseph's. By 1869 their La Salle College produced its first graduates when Bishop Wood conferred Bachelor of Science degrees on six students who had "completed the prescribed course of Classics, Mathematics and General Literature." It was not until 1872 that Villanova College reached this academic milestone with its first B.S. degree, thus underscoring how this new Christian Brothers institution secured early success by granting modest yet explicit attention to science. Fittingly, La Salle College found itself mentioned first in the 1869 *Catholic Standard* newspaper article cited at this chapter's opening, for here was an 'improved' Catholic college that succeeded where the Jesuits had failed.[98]

Conclusion

In 1869 when *The Catholic Standard* touted La Salle College and eight other Philadelphia area institutions, it publicized just some of the Catholic colleges that could have been celebrated for offering "superior advantages" to Catholic and other youth by way of

[98] Details of Bishop Wood approaching Brother Teliow about a college appears in Thomas J. Donaghy, *Conceived in Crisis: A History of La Salle College 1863-1965* (Philadelphia: Walther Printing House, Inc., 1966), 1-9, esp. pg. 2, also a brief history of the college offered in Angelus Gabriel, *The Christian Brothers in the United States 1848-1948: A Century of Catholic Education* (New York: The Declan X. McMullen Company, Inc., 1948), 411-415. A biography of Bishop Neumann with details of his passing found in Michael J. Curley, *Venerable John Neumann, C.SS.R, Fourth Bishop of Philadelphia* (Washington, D.C.: Catholic University of America Press, 1952), 394. The La Salle College charter publicized in *Laws of the General Assembly of the State of Pennsylvania passed at the session of 1863* (Harrisburg: Singerly & Myers, 1863), 174-175. La Salle's takeover of the building used by the Jesuits along with the larger history of St. Joseph's College in David R. Contosta, *Saint Joseph's: Philadelphia's Jesuit University, 150 years* (Philadelphia: Saint Joseph's University Press, 2000), 38. La Salle's first graduates listed and Bishop's Wood's participation described in "La Salle College," *The Catholic Standard*, July 3, 1869, 4. Villanova College caught up with La Salle College in awarding a B.S. degree in 1872, see details about the June 26, 1872, commencement found in *Annual Catalogue of the Officers and Students of Villanova College, Delaware Co., Penna., for the Academic Year 1871-72* (Philadelphia: Eugene Cummiskey, 1872). The list of 'improved' colleges appeared 1869 newspaper article cited earlier with the title "Education," showing La Salle College listed first though it was the most recently founded in 1863 of the nine colleges listed (a case of the last will be first?).

"constant improvement." Having won an initial foothold on the American educational landscape, Catholics now worked to open additional colleges given the burgeoning population of Catholics in America and, more to the point of this chapter, to strengthen all of these institutions when it came to the teaching of science. I have shown evidence that, when it came to Catholic institutions, science continued to matter in the mid-nineteenth century as much as it did when Georgetown Academy first opened in 1792, with three identifiable themes emerging during this period vis-à-vis these efforts.[99]

The first theme identifies the willingness of Catholics and their associated teaching orders to go against established traditions in adapting to the still emergent American educational landscape. For the Jesuits at St. Louis College who were told "let nothing new be introduced" in deference to the *Ratio Studiorum*, they obtained clearance from Rome to charge tuition which ensured the school's financial survival and ability to teach science per the *Ratio* and went on to establish an unsanctioned commercial course which helped to secure additional student enrollments as well as offering another avenue for teaching science. For Mother Guérin at St. Mary-of-the-Woods in Indiana, having learned of the American appetite for science from the Sisters of Charity who conducted a girls school in Maryland where "they teach the various sciences scarcely known in our French schools," Guérin sensibly taught astronomy and mathematics along with traditional subjects like botany and needle work which delivered much desired "useful knowledge" to her young students. For these two institutions, "constant improvement" meant early and deliberate actions in constructing a setting for teaching science that successfully aligned with student and parental wants as well as the needs of their Catholic administrators.

[99] Here I return to this chapter's epigraph quoted from this Philadelphia newspaper dated August 14, 1869.

A second theme points to the work of American Catholic higher education to promote science by bestowing unconventional degrees, certificates, and other like credentials. In the vanguard stood Santa Clara College which conferred the first Bachelor of Science degree from a Catholic institution in 1859 ahead of more well-known American schools like the Massachusetts Institute of Technology (which was only incorporated in 1861). Medical degrees offer further evidence of prioritizing science when the Jesuits governing St. Louis College approved the addition of a medical school that from 1842 to 1854 conferred 223 M.D. degrees, a significant contribution by the first medical school west of the Mississippi, Catholic or otherwise. Notre Dame's move with the creation of a medical certificate degree for students who then gained a M.D. elsewhere warrants like mention as another way to offer and impart science education. Together with the various commercial and other diplomas offered at Catholic institutions, these academic awards not only spotlight some of the compelling and satisfying improvements Catholics made to their schools, but they also confirm unmistakable attention to the teaching of science.[100]

The contributions made by an individual in bringing about any of the improvements described in this chapter defines my third theme. Ranging from someone in a leadership position to a teacher in a classroom, on many occasions it fell to one person to bring about crucial changes or acquire wanted instructional tools in order to improve the education being offered by a Catholic college. Examples in the latter category include Fr. James Curley at Georgetown who constructed a first-class observatory for student teaching, the Rev. Pierre-Jean DeSmet who made an overseas purchase of a complete physical science cabinet for St. Louis College that included a pair of Blaeu globes, and Fr. Samuel Mazzuchelli in Wisconsin who made his own personal

[100] The number of St. Louis College medical school M.D. recipients tallied from commencement details given in the school's annual bulletins and announcements for 1844 through 1855.

instruments available for instruction at Saint Clara Academy. Administrative creativity and vision appeared in the person of President the Rev. Charles Van Quickenbourne who negotiated with Rome about charging tuition at his Jesuit college in St. Louis and Fr. Edward Sorin making the most of his limited instructors for teaching science at St. Mary's and Notre Dame in South Bend, Indiana, as well as devising a practical medical certificate degree for aspiring medical students. Sorin as well as Mother Guérin also demonstrated the greater long-term productivity that came with holding office over decades which promoted the introduction and then perpetuation of science instruction at their institutions. Overall, behind each improvement stood an individual who, through either personal moxie or some higher vision, enhanced the place of science in American Catholic higher education.

Yet amidst the willingness to challenge old educational practices and grant uncommon academic awards, there were signs that these modes of constant improvement, or control over these modes, were being usurped by higher authority. The efforts by a succession of bishops in Philadelphia to establish schools, with mixed results, provides one example of what could be termed a shift from individual bottom-up endeavors to more of a top-down control model at the bishopric or national level. How well this new model worked given the rapid pace at which science was expanding in the America both in content and manner of teaching will be the focus of the next chapter. While *The Catholic Standard* newspaper praised Catholic colleges in 1869 for their better "facilities and conveniences," even greater improvement would be needed in subsequent decades in response to new conditions arising, in part, from competition with existing and new non-Catholic institutions. As Brother Azarias of De La Salle Institute in New York City

would query in 1889: “Do we find nothing in them to improve upon?” Undeniably having better schools would no longer suffice as Catholics needed to have the best schools.[101]

[101] Brother Azarias, "The Lessons of a Century of Catholic Education," *The Catholic World* 50:296 (1889), 143-154, pg. 151. More information about Brother Azarias, a member of the Christian Brothers order and teacher of literature and mathematics, see the Brother Azarias entry in Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 2:166-167.

Map 4 – Locations of institutions mentioned in *Responding* chapter

Chapter 3: Responding

The second century of our educational existence will find many things to complete and amend in our present institutions. It is best that we look the fact full in the face, and recognize it, and set about supplying our shortcomings according to time and occasion.

From "The Lessons of a Century of Catholic Education"
by Brother Azarias in *The Catholic World* (1889)[1]

Ever since Georgetown Academy opened its doors on January 2, 1792, American Catholic higher education engaged in recognizing and responding to problems. After a century of launching and oft times closing over 230 institutions of higher learning, the Jesuits, Ursulines, and many other Catholic teaching orders involved in this work knew firsthand theirs was not a static endeavor in making Catholic education a respected option in American education. As they overcame the many initial challenges of building up a Catholic educational enterprise, institution by institution, toward mid-century their overall venture, now numbering roughly forty surviving colleges, began to improve their academic offerings while at the same time starting to draw criticisms from Catholics about how subjects such as science should be taught. Orestes A. Brownson, a Catholic convert and critical supporter of Catholicism, favored "permitting [our children] to learn under our own guidance and direction all that the non-Catholic philosophy, literature, and science can offer," while one unnamed author felt that "we do not need to dwell much on scientific education, because that is really of secondary importance." By the 1890s more substantial concerns loomed over Catholic colleges besides questions about science instruction. One such disapproval was expressed openly and bluntly in 1893 by Notre

[1] Azarias, "The Lessons of a Century of Catholic Education," , pg. 147.

Dame English professor Maurice Egan, who "caused something of a sensation" at the World's Catholic Congress then taking place as part of the 1893 Columbian Exhibition in Chicago. His talk on the fifth day of the Congress would declare that "A crisis has come in higher Catholic American education. If it remains stationary now, it must eventually go backward." As Brother Azarias said in the above epigraph and confirmed by Egan, there were "many things to complete and amend" when it came to American Catholic education and particularly in teaching science.[2]

In contrast to my first two chapters which explored how Catholics established and improved their schools, this chapter steps back to investigate how Catholics responded to problems, criticisms, or new conditions connected to their colleges and universities during the latter part of the nineteenth century. Exploring their responses, or sometimes non-responses, with an eye towards teaching of science offers novel insights about the priority and purposes granted to science in supporting their schools. This chapter also looks at two responses of non-Catholic colleges to nearby Catholic institutions that had accorded conspicuous visibility to science in their curricula to cross-validate their reactions to a perceived competitive need to teach science. Another kind of response involves an established Catholic college replicating itself in a new location where I show how science played a part in that effort to expand Catholic education. Not all responses led to good outcomes and Catholic historians have not been gentle when

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[2] Brownson's comment concerning science in Orestes A. Brownson, "Present Catholic Dangers," *Brownson's Quarterly Review* 2 (1857), 349-374, pg. 363. Two contemporary publications shed more light about Brownson's views on Catholic education, see Edward John Power, "Brownson's Attitude towards Catholic Education," *Records of the American Catholic Historical Society of Philadelphia* 63:2 (1952), 110-128, and James M. McDonnell, *Orestes A. Brownson and Nineteenth-Century Catholic Education* (New York: Garland Publishing, Inc., 1988). The second comment about science appeared in "College Education," *Catholic World* 25:150 (1877), 814-825, pg. 825. Egan's critique reported on in "Education of Catholics: Noted Men of the Roman Church Speak at the World's Congress," *Indianapolis Journal*, September 9, 1893, 2, with the "substance" of his talk found in *The World's Columbian Catholic Congresses: with an Epitome of Church Progress* (Chicago: J.S. Hyland & Co., 1893), 103-106.

describing this late nineteenth-century moment when they pronounce Catholic higher education being in a "backwater" when measured against rival colleges and universities.[3]

Deficient responses to teaching sciences

Any shortcomings needed to be recognized before actions and improvements could take place and not every Catholic institution demonstrated this kind of alertness. Seattle College, a Jesuit institution founded in 1891 and incorporated in 1898, began to advertise at the turn of the century a new four-year college course defined as a "classical course of studies . . . whose success in developing and training all the powers of the mind, and rendering it capable of understanding and appreciating all branches of learning, centuries of practical experience make manifest." Or in so many words, the college packaged the last four years of the traditional *Ratio*-based curriculum into a course concluding with a Bachelor of Arts degree where science and mathematics would be taught only when "the student's development admitted of its being pursued in a systematic way." This scheme showed little competitive awareness of the science-rich curriculum offered at the nearby University of Washington, a coed institution whose first degree, a Bachelor of Science to Clara McCarty in 1876, along with attendant laboratories in chemistry, botany, physics, zoology, minerology, and assaying flagged Washington's curriculum as unmistakably attentive to teaching across many scientific fields. Given Seattle College's low

[3] Historian Robert Bruce used the term 'new conditions' in connection with "the new education" associated with the teaching of science after the Civil War in Chapter 24, "The New Education," from Bruce, *The Launching of Modern American Science 1846-1876*, 326-338, above quotation on pg. 326. While Jesuit historian Gerald McKevitt wrote about a single college in California (Santa Clara) that found "itself in an educational backwater" around the turn of the twentieth century sociologist Andrew Greeley deemed all Catholic higher education in a backwater at that period; see McKevitt, *The University of Santa Clara: A History, 1851-1977*, 308, in addition to Greeley, *From Backwater to Mainstream: A Profile of Catholic Higher Education*. In contrast to these references, one Catholic historian unhelpfully contended in 1943 that a lack of influential conditions connected to Catholic schools and colleges existed for most of the nineteenth century "until the closing of the land frontier in the West," thus "the history of the Catholic Church [consisted] monotonously of new missions, new churches, increased clergy and new dioceses"; see Thomas T. McAvoy, C.S.C., "Americanism and Frontier Catholicism," *The Review of Politics* 5:3 (1943), 275-301, pg. 278.

perceived need to prioritize the teaching of science, even if allowed or encouraged by the Jesuit's centuries-old curriculum or by obvious local demand vis-à-vis the University of Washington, the destinies of its first three graduates in 1909 generate little surprise: a Jesuit, a high official in the Seattle Catholic diocese, and a local coal merchant. While proclaimed "an epoch in the Catholic educational life of our city," their graduation confirmed a certain deafness to the teaching of science in obvious contrast to a neighboring institution a mere five miles away.[4]

In 1891 another Jesuit school, Detroit College, sensed an escalating need to provide instruction in science when it saw its graduates enroll at the University of Michigan 40 miles distant. "Though Detroit College has been in existence only about thirteen years it has already sent quite a number of its graduates to Ann Arbor" where they "have been a credit to their *Alma Mater* and their faith," wrote an unnamed Jesuit in a *Woodstock Letters* report. This same Jesuit then went on to lament that "there is, at least in this part of the country, no Catholic institution to which [students] can be sent for specialties, such as civil-engineering, electric-engineering, mining, pharmacy, and the like. How soon will the Catholic University be able to fill this want?" Having just opened in 1889, the new Catholic University of America in Washington, D.C., stood years, if not decades, away from teaching in these fields of science and technology, especially at the graduate level, which was this institution's original raison d'être. While the fledgling Catholic

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[4] *Seattle College Announcements 1901-1902* (Seattle: Mensing-Muchmore Co., 1901), 6, 7. Contrary to the title page of this document, founding took place in 1891, not 1892, and the institution was "chartered" in 1898 as claimed with chartering actually meaning simple incorporation and not by legislative approval as the Washington Legislature only met in odd numbered years in the late 1890s. State law allowed conferral of degrees by "incorporated colleges" with no mention of curricular minimums or content; see Richard A. Ballinger, et al., *Remington & Ballinger's Annotated Code and Statutes of Washington* (Seattle: Bancroft-Whtney Company, 1910), 2:220-227. *Catalogue for 1900-1901 and Announcements for 1901-1902 of the University of Washington* (Olympia, 1901), 21, 36-45. The three graduates from 1909 were: Father John A. Concannon, S.J., who taught Spanish and other subjects for many years at Gonzaga College in Spokane; Rev. Theodore M. Ryan who served as Vicar General under the Seattle archbishop; and James Charles Ford, Jr., who worked as a merchant for the Cascade Coal Company. A report on the college's graduation ceremony appeared in "First Graduating Exercises of Seattle College," *The Catholic Northwest Progress*, July 2, 1909, 1. For additional details about Seattle College, see Timothy F. Cronin, S.J., "Seattle University: 1891-1966," unpublished dissertation, Seattle University, 1982. Seattle College would not award its first Bachelor of Science degree until 1937.

University might someday provide Catholic students an appropriate science education along with a safe religious haven compared to the secular University of Michigan where "none but the firmest of the students survive the strain upon their faith," why then was not neighboring Notre Dame University with its well-established curriculum in science and engineering seen as a viable option? To posit an immature institution with a non-existent school of science as the solution when a ready-to-hand option stood less than 150 miles away suggests a lack of awareness, if not cohesion, among Catholic institutions. Moreover, underlying the Catholic University suggestion was the persistent concern about protecting the faithful over the realities of needing to teach science, a surprising high priority from this Catholic religious order that previously granted science instruction to good effect as seen with, for example, Santa Clara College. Oddly, two years prior to voicing these concerns, Detroit College employed Charles F. Crowley, an 1887 alumnus and soon to be 1889 University of Michigan pharmacy school graduate, as their chemistry professor. So, while Detroit College advocated Catholic University as the solution for teaching science to Catholic students, in this roundabout manner the school quietly improved its own situation with a little help from the University of Michigan.[5]

[5] "Varia - Missouri Province," *Woodstock Letters* 20 (1891), 300-301. The opening of Catholic University, including its "dedication of the University to Almighty God," richly described in *Solemnities of the dedication and opening of the Catholic University of America, November 13th, 1889* (Baltimore: John Murphy & Co., 1890). Undermining the veracity of this report regarding the faith-destroying power of the University of Michigan comes from an unexpected direction: The Mormons. An 1894 Mormon journal included an article about this university, calling it "a great and grand institution" and noting how "the degree of Bachelor of Science is given for the course in general science, and for the courses in engineering, in chemistry and in biology." No mention was made of Michigan being a place where "Utah's sons and daughters" would risk their faith; see the three-part article by Richard R. Lyman, "The University of Michigan, Ann Arbor," *The Juvenile Instructor* (1894), 29:6; 265-69, 29:12; 361-365, and 29:14; 425-429. Crowley graduated from Detroit College with an A.B. on June 29, 1887, earned his Ph.C./Pharmaceutical Chemist degree from Michigan in 1889, then returned as a faculty member at Detroit College where he started to be listed as their professor of chemistry in 1891. A good overview of Detroit College offered in Herman J. Muller, S.J., *The University of Detroit 1877-1977: A Centennial History* (Detroit: University of Detroit, 1976). Detroit College would not award its first Bachelor of Science degree until 1912.

Catholic University of American - Positive Response, Poor Outcome

Detroit's call for the new Catholic University to fill the "want" of science and technology specialties left unclear its role either as a place for high-level graduate work or as a simple adjunct to existing Catholic college curricula. An 1879 review of the American Catholic educational system projected that "the establishment of a Catholic University . . . would crown the system" whereas an 1876 essay commented that a new Catholic university should extend what existing colleges could offer through "the greater variety of studies, the higher standard of attainment, the more frequent and rigorous examinations, the greater number and skill of professors." While John Henry Newman's *The Idea of a University* informed some early discussions of an American Catholic university as a place of teaching, later debates began to display a more nationalistic goal of Catholics having a flagship educational institution of their own able to produce knowledge, an aim congruent with the research designs of the Johns Hopkins University, which opened in 1876. An anonymous 1884 *New York Times* article pontificated that "as a scientific school a Roman Catholic university would hardly be successful" given "the Church of Rome is generally regarded as hostile to modern science." A passionate refutation countered this view to say "Let the *Times* rest satisfied. When the Catholic University of American becomes a fact its teachings, scientific and otherwise, will be broad enough, deep enough, and of such a universal character as to make the *Times* wonder - at itself." When Catholic University did become a reality in Washington, D.C., on November 13, 1889, the *Times* report the following day spoke of a dedication ceremony singularly religious in format and tone. The only mention of science came at the end of the article saying that Father George

Searle had been engaged as a lecturer who would soon deliver lectures "on physics and astronomy."[6]

Catholic University commenced instruction on Monday, November 18, 1889. Its solitary school of theology, staffed by eight professors, would teach forty-six enrolled students, most of whom were already ordained priests. They would embark on a course of "deeper, broader, and more practically applied" theological studies that would enhance their future religious endeavors. This initial curriculum aligned with the 1885 funding *Appeal to the Catholics of the United States* that deemed it "advisable to begin with the faculties of philosophy and theology, to which in due course of time all the other faculties needed to constitute a true university will be aggregated." It would be another six years before the first two of these new faculties appeared, when McMahon Hall, a purpose-built science building, opened in 1895 and provided a much-needed home for the sciences with a school of philosophy and a school of social sciences. In the interim the Rev. Searle became one of the few visages of science at this Catholic institution when he launched a series of free public astronomy lectures starting in January 1890 that were open to "all friends of university education" and "to which an additional charm was given by the use of stereopticon views." At the same time, Searle worked hard to organize a new campus observatory

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[6] John O'Kane Murray, *Catholic Education in the United States: A Statistical Review* (New York: E. Steiger, 1879), 1. "Shall we have a University?," *American Catholic Quarterly Review* 1:2 (1876), 230-277, reviewed John Henry Newman's 1856 work *Office and Work of Universities* and, according to Ellis (see citation below), was written by Thomas A. Becker, would became the first Bishop of Wilmington in 1868. Becker's quotation found on pg. 239 and the mention of Becker by Ellis on pgs. 57-60. Ellis is one of two references about the founding of Catholic University, see John Tracy Ellis, *The Formative Years of the Catholic University of America* (Washington: American Catholic Historical Association, 1946) and C. Joseph Nuesse, *The Catholic University of America: A Centennial History* (Washington, D.C.: Catholic University of America Press, 1990), chapters 1-4. Newman spoke of a university as "a place of *teaching* universal *knowledge*," see John Henry Newman, *The Idea of a University,* 3rd ed. (London: Basil Montagu Pickering, 1873), preface. The *Times* comment in "The New University," *New York Times*, December 13, 1884, 4, and rebuttal in the "The New York "Times" and the Catholic University," *The Ave Maria* 21:9 (1885), 176. Good overview of American Catholicism and science found in David Mislin, "Roman Catholics," in Jeff Hardin, et al. (eds.), *The Warfare between Science and Religion: The Idea That Wouldn't Die* (Baltimore: Johns Hopkins University Press, 2018). Coverage of Catholic University opening appeared in "Blessed by the Cardinal: Dedication of the Catholic University," *New York Times*, November 14, 1889, 1,2.

with a telescope capable of supporting his research interests. Despite these efforts, teaching science remained overshadowed during these early years of Catholic University by the "pioneering students of the Divinity School" studying at "this crowning monument of Catholicity in the United States," a promising testament to how Catholics responded to 'new conditions' facing their religion, but a disappointing response to 'new conditions' given this institution's stated dreams of teaching science.[7]

The Rev. Searle faced two basic challenges to organizing astronomy at Catholic University during these early years. The first involved being called on to give public lectures at the expense of his astronomical course and time needed to setup the wanted observatory. "I could not continue my astronomical course," wrote Searle to Bishop Keane, Rector of Catholic University, in September 1890, as his public lectures demanded preparation work of a different nature versus a classroom situation as well as simply being a heavy demand on his time. Searle had presumed his lectures would "be given occasionally; and I understood that you approved of this programme." Instead, Keane apparently wanted the public lectures to continue, to which Searle rejoined "I shall hardly have got to work in the observatory . . . and do any work to speak of there." Yet Searle ended his letter yielding to his university and, more critically, religious superior "But of course if you say 'lecture', I will do the best I can." The second challenge involved the cost of a new observatory and its instruments. In March 1890 Searle travelled to Boston to examine a used telescope that "though somewhat of a bargain is hardly worth our

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[7] *Solemnities of the dedication and opening of the Catholic University of America, November 13th, 1889*, 75. This publication also listed the university's professors, pgs. 78-79, lecturers, pgs. 79-80, and its students, pgs. 81-83. *An Appeal to the Catholic of the United States in behalf of the University* (New York: The Catholic Publications Society Co., 1885), 4. McMahon Hall and the two new schools mentioned in Nuesse, *The Catholic University of America: A Centennial History*, 110. Searle's February 1890 lectures mainly publicized in local D.C. newspapers, see "Catholic University Lectures," *Evening Star*, February 4, 1890, 8. Searle's lectures and the blissful life of Catholic University students described in "Student Life at the Catholic University," *Catholic World* 51: 303 (1890), 358-364, quotations on pgs. 361 and respectively.

while" and instead arranged to buy a new 9" refractor from well-known Boston instrument maker John Clacey for $1000 which was "below its proper price." Even with this saving, Searle told Keane that a "chronograph (price $350) is of first importance; and a clock, which can be got for $150 (good enough) is also almost indispensable." Fundraising became necessary to help cover these science-related costs with Searle grousing that "it does seem a shame that Catholics are so unwilling to do anything for scientific purposes, when Protestants will give by the hundred thousand and the million." As if in answer to Searle's complaint, a $500,000 donation to the university came in April 1891 from the Rev. James McMahon, a New York City priest who was well-invested in property, which soon put teaching science at Catholic University on a much sounder footing with the opening of McMahon Hall in 1895. All that was needed now were science students.[8]

As the "crown" of American Catholic higher education, Catholic University ostensibly stood over all other Catholic colleges and universities in providing the highest possible education, in effect a tacit structuring of a new informal association of Catholic institutions. This structure aligned well with the long-established hierarchy of American bishops and archbishops who from 1889 onwards helped to recruit divinity students, thus generating a flow of ecclesiastical students from Catholic institutions into Catholic University that worked with pleasing efficiency. In 1889 Bishop Keane, rector of Catholic University, travelled in person to meet with his colleagues as "the procurement of these students is at present Bishop Keane's task,

[8] Letter from Searle to "Bishop Keane" dated September 27, 1890, CUAA, Keane Collection, Box 1, Folder 1/110. Searle's remarks about the used telescope in a letter to Keane from the same folder dated March 30, 1890, while his request for accessory instruments and comments about Catholic stinginess appeared in a letter dated December 31, 1890, also the same folder. About Clacey, see Staff of the National Bureau of Standards, "John Clacey - Optician," *Popular Astronomy* 38 (1930), 472-477, also comments about the Catholic University telescope on pg. 475. About McMahon's gift, read "A Princely Gift: What Father M'Mahon has to say about his donation," *The Critic-Record*, April 18, 1891; also his obituary explains the circumstances of his wealth: "Mgr. McHahon Dead: Was Once Pastor of St. Andrew's, this city - considered the richest priest in the country," *New York Times*, April 16, 1901, pg. 9.

and it is on this business that he is in Chicago and the West." By 1891 Catholic University let notices and letters do this task by communicating the plea "that every Bishop will consider it a duty to have at least one student at the University." This bishopric cooperation worked well for Catholic's school of theology, but not so efficiently in recruiting for Catholic's new school of philosophy which opened in 1895 and incorporated the physical sciences, mathematics, astronomy, and the biological sciences. Given that archbishops and bishops did not dabble directly in the sciences, it would fall to Searle and other faculty in this new school to attract and otherwise draw students to their various departments.[9]

In October 1895 Catholic University's new School of Philosophy listed eight faculty who would fill the "want" of science and technology specialties. Although Searle had good experience to go with his 1860 M.A. from Harvard, five other possessed more recent doctorate degrees, including one from Berlin, one from Leipzig, and three from Johns Hopkins University. Even though most were Catholic, only one held an advanced degree from a Catholic institution, an M.S. from Notre Dame. As a group, these men represented Catholic University's best response to a need to teach science and perhaps, in time, they would stand under part of the "crown" being so readily applied to this institution although it remained too soon to claim, as did Jean Baptiste Abbeloos, rector of the University of Louvain, in his letter of congratulations, that "the Catholic University has taken its definite place in the scientific world."[10]

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[9] Keane's travels reported in "The Catholic University: Bishop Keane, the Rector, looking for students," *New York Times*, June 16, 1889, 8. Plea from an eight-page letter from Cardinal Gibbons, Chancellor of the University, to the Archbishops and Bishops of the United States, Baltimore, May 1, 1891, ACUA, Volume 3, item 11, pg. 3.

[10] Details about Catholic University faculty in 1895 and the Abbeloos quotation come from the *The Catholic University Bulletin* (Washington, D.C.: Catholic University of America, 1895), vol. 1, University Chronicle section, pgs. 111-113 and pgs. 109-111, respectively.

By 1891 Searle had extricated himself from lecturing to begin observatory work with the school's new 9-inch telescope under a research program where "special attention will be paid to observing of double stars and of those asteroids and comets which positions are desired." While his work in predominantly old positional astronomy likely proved satisfying along with Catholic University being the only D.C. observatory to obtain photographs of a November 1891 lunar eclipse, it did not represent a siren's call to potential astronomy students. Perhaps in response to this matriculation reality, the university's 1895 bulletin allocated a mere half page for Searle's home Department of Mathematics which described lectures in mathematics as now being "supplemented by work . . . in the Astronomical Observatory." Searle's mathematical abilities had long found solid application to problems in astronomy such that Catholic University awarded him the Ph.D. degree in 1896 for this past work. This aspect of Searle never stood in doubt nor his professional relationships with other astronomers, such as Benjamin A. Gould, editor of the *Astronomical Journal*, but what proved problematic was simply how far behind Catholic University stood compared with the leading universities of the day, particularly the University of California with its Lick Observatory and the University of Chicago with its soon-to-open Yerkes Observatory. The $1200 meridian circle instrument given anonymously to Catholic University in 1895 paled against the million-dollar costs connected with those two advanced facilities. Ultimately teaching graduate-level astronomy was a race Catholic could never hope to join let alone an event where the university might someday award doctorates (other than Searle's). To be fair, very few astronomy Ph.D.s were awarded prior to 1900, so for Searle to place his strength in mathematics towards all graduate education at Catholic University became the best possible outcome for him and Catholic University as they attempted to respond to 'new conditions'. Searle knew this when he wrote mathematics was a "pure science, and one

interwoven with and necessary to so many other sciences, that mathematics should be principally considered in university teaching." It would be in those "other sciences" that Catholic University found some strength.[11]

Boasting a pair of professors with chemistry doctorates from Johns Hopkins University, Catholic University foregrounded their chemistry department in the institution's 1895 bulletin with nearly four pages of details on curriculum, advanced study options, and facilities, including laboratories for general, analytical, and organic investigations, the latter highlighted as being furnished "with all the most recent time-saving devices and conveniences." This advertising paid off with 12 out of the 57 students enrolled that fall term taking an offered chemistry course from either the Rev. John J. Griffin or Frank K. Cameron. However only three of these students indicated that they sought a Ph.D. degree, and none succeeded in reaching that goal. Furthermore, in 1897 Cameron parted company with the university to join the faculty of Cornell University, leaving Griffin to carry on with teaching. As a student at Johns Hopkins, Griffin stood out as "one who is well qualified to engage in teaching Chemistry as his life work" along

[11] Again the university gained notice beyond the D.C. region when its new telescope was mentioned in "Telescope for Catholic University," *The New York Times*, September 27, 1891, pg. 14. Catholic's good fortune mentioned in article "Scientists at Work on the Lunar Eclipse. Big Telescope and Little were brought into requisition," *New York Herald*, November 16, 1891, pg. 3 paragraph subtitled "A Few Photographs were secured at the Catholic University." Studies in Searle's Department of Mathematics explained in *The Catholic University Bulletin*, vol. 1, pgs. 250-252. One example of Searle's work shows him blending mathematics and astronomical observation seen in Rev. Geo. M. Searle, "On a method of correcting a first parabolic orbit to represent a later observation," *The Astronomical Journal* 10:2 (1891), 9-10. Searle's doctorate degree given for his "eminent services both to science and religion," from *The Catholic University Bulletin* (Washington, D.C.: Catholic University of America, 1896), vol. 2, University Chronicle section, "Conferring of Degrees," pgs. 215-217. News of the anonymous $1200 "Gift to the Observatory" listed in *The Catholic University Bulletin*, vol. 1, University Chronicle, pg. 565. While anonymous, Searle apparently knew of its arrival back in 1890 such that he told Gould; this based on a May 25, 1890, letter from Gould to Searle who wrote: "And so you are to crow over the possession of a Greenwich meridian all your own! – good." Letter from CUAA, Keane Collection, Box 1, Folder 1/110. Astronomy Ph.D. production discussed in Lankford, *American Astronomy: Community, Careers, and Power, 1859-1940*, 94-119. Searle's view about the place of mathematics in the sciences his essay in *The Catholic University Bulletin*, vol. 2, pgs. 334-342, quotation on last two pages. About Catholic's observatory, it burned down in 1924 and was not rebuilt. Searle passed away six years before this event on July 8, 1918; other than the perfunctory obituary paragraphs in the journals *Science* and *Nature*, Searle's death received a proper announcement in "Father Searle is dead," *The Catholic Bulletin*, July 20, 1918, pg. 8.

with his research where he displayed "skill and industry." Griffin brought these qualities and high standards to Catholic and expected them of any students applying to his department. In a March 1899 letter to the Rev. Dr. Thomas J. Conaty, then rector of the university, Griffin indicated that any incoming chemistry students should have completed a "two year course" from "the better class of our colleges" and continued to spell out his main complaint about poorly prepared applicants:

> Chemistry is studied like history: the student masters a series of facts without regard to connection or underlying principles, no laboratory work worthy of the name is given, and the main purpose of the study in elementary schools – the development of the faculty of observation – is entirely lost sight of.

As it turned out, in the fall of 1899 a well-prepared incoming student, Julius A. Nieuwland, who had just earned a Bachelor of Arts degree from Notre Dame University, entered Catholic University to study chemistry and botany. Not only did Nieuwland pursue chemistry at Catholic, but he also entered nearby Holy Cross Seminary in preparation for the priesthood. Ordained in 1903 and awarded his doctorate from Catholic University the following year, Nieuwland epitomized the aims of this institution in showing Catholic attentive to teaching science at the highest level.[12]

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[12] Griffin and Cameron defended dissertations on analytical chemistry topics done under Ira Remsen; see published versions: John J. Grffin, *On the Reaction of Ethyl and Methyl Alcohol with Paradiazometatoluenesulphonic Acid in the presence of certain substances and on Metatoluenesulphopic Acid* (Ralson, PA: Chemical Publishing Company, 1895) and Frank Kenneth Cameron, *A study of the reaction of certain diazo compounds with the alcohols* (Baltimore: Deutsch Lithographing & Printing Co., 1894). Department of Chemistry details in *The Catholic University Bulletin*, vol. 1, 252-255. A list of students, courses taken in 1895, and their academic goals found in *The Catholic University Bulletin*, vol. 2, 113-116. A good overview of the department's early history, which mentions Cameron's departure, in Leopold May, "The Early Days of Chemistry at Catholic University," *Bulletin for the History of Chemistry* 28:1 (2003), 18-25. Griffin's qualities while a student at Johns Hopkins from an undated/unsigned letter from CUAA, Keane Collection, Office of the Rector, file folder 2/125. Griffin's letter to Conaty, dated March 13, 1899, from Conaty Collection, Office of the Rector, file folder 3/27. Nieuwland's graduation on June 15 noted in the *Catalogue of the University of Notre Dame 1898-1899* (Notre Dame: The University Press, 1899), 185. His unexpected death and life details along with many telegrams of condolence noted in "Fr. Nieuwland dies suddenly in Washington," *The Notre Dame Alumnus* 14:9 (1936), 247-248, 251. His dissertation on "Some reactions of acetylene" later led to work related to development of the WW I poison gas Lewisite, see Joel A. Vilensky, *Dew of Death: The Story of Lewisite, America's World War I Weapon of Mass Destruction* (Bloomington: Indiana University Press, 2005).

Although Nieuwland's academic achievement reflected well on Catholic University, it was only the second science Ph.D. conferred by the institution's School of Philosophy since opening in 1895. The distinction of the first doctorate belonged to Herman Theodore Holm who received a Ph.D. in botany in 1902 under that department's one professor, Edward L. Greene. Prior to immigrating to America from Denmark in 1888, Holm already possessed valuable botanical field experience when he served as the naturalist for the 1882 Danish Expedition to the North Pole, work that he would build upon as an advanced student at Catholic University. In 1896 Holm mentioned in a paper he presented at a Biological Society of Washington meeting that it was Greene who called his attention "to the fact that our knowledge of the Arctic flora is not of recent date," thus setting the stage for Holm to study under Greene towards a Ph.D. degree. When the university's rector requested a short biographical sketch about Holm prior to his graduation, Greene wrote, among other words of praise, that Holm "is an expert specialist in arctic botany." How odd then must it have been to hear the closing address of rector the Rev. Dr. Thomas J. Conaty at Holm's June 1902 commencement ceremony when he deigned specialization, that "the university is for something higher than mere specializing. It should result in cultivated men with sympathy for all forms of knowledge." These words, while perhaps casting a pall over Holm's accomplishment, probably pained Greene even more as months earlier "administrative authority" had asked the faculty of his school "to express an opinion as to the 'utility of retaining the department of Botany, in the present condition of the University.'" His response, the writing of which was "most distasteful to me," gives up details showing the unbridgeable gap between Greene's nearly seven years of work in making botany at Catholic University "known and praised far and wide in the world of universities for the great amount and

the high quality of its work" and administrative authority's perception of botany as an apparently inutile specialty in science.[13]

By 1904 Greene had parted ways with Catholic University and taken up residence as an honorary botanist at the Smithsonian Institution for a decade of "fruitful" research and publishing. Along with Greene went not only his extensive collection of books, but plant specimens acquired over a lifetime of work in botany, valuable specimens formerly housed at Catholic for just "the value of a set of herbarium cases and nothing more." What Greene's departure laid bare was tensions between a classical Catholic education aimed at developing the whole person and the need of a modern curriculum that worked to teach science for increasingly specialized fields: Catholic University sought to offer the latter, but when botany at the graduate level received judgement as "mere specializing," Greene, a Catholic convert with a world-renown reputation, an "invaluable" library and plant collection, and solid academic experience from founding the University of California botany department, the scales fell from his eyes and he left. For twenty-five years a botanical vacuum would remain at Catholic University, a pity

[13] Just a little over one page of names appeared of those receiving doctorates in science at Catholic University from 1897 to 1928, see *Doctoral Dissertations published by the students of Catholic University of America* (Washington, D.C.: Published by the University, 1928), 14-15. Holm's dissertation about North American Gramineae, or grasses, was published in a German botany journal and then as a small book: Theo. Holm, "Some new anatomical characters for certain *Gramineae*," *Beihefte zum Botanischen Centralblatt - Original Arbeiten* 11 (1902), 101-133, and Herman Theodor Holm, *Some New Anatomical Characters for Certain Gramineæ* (New Haven: Tuttle, Morehouse & Taylor Company, 1903). Holm mentioned Greene and using his "invaluable botanical library" in the opening paragraph of Theo. Holm, "The Earliest Record of Arctic Plants," *Proceedings of the Biological Society of Washington* 10 (1896), 103-107. Greene's handwritten note dated January 23, 1902, about Holm to Rector Thomas J. Conaty, who replaced Rector Keane in 1896, in CUAA, Conaty Collection, Office of the Rector, file folder 3/33, box 3. Strangely, Holm's obituary in *Science* failed to mention either his Catholic University Ph.D. or Greene, but mainly his work for the U.S. Department of Agriculture; see "Herman Theodor Holm," *Science* 77:1990 (1933), 183-184. Conaty's belittling of specialization recounted in "Degrees Awarded: those who received the honors of the institution; Eloquent Remarks by the Rector, Bishop Conaty, and by Cardinal Gibbons," *The Evening Star*, June 4, 1902, 18. The larger issue of specialization in the university given good attention by Jon H. Roberts, et al., *The Sacred and the Secular University* (Princeton, N.J.: Princeton University Press, 2000), chapter 5, "The Boon and Bane of Specialization." Greene's opinion and other comments from a confidential report dated March 12, 1902, see Edward L. Greene, A Report to members of the faculty of Philosophy, Catholic University of America, as to its department of Botany, 1902, CUAA, Conaty Collection, Office of the Rector, file folder 3/29, box 3, quotations from pgs. 1 and 9.

given Conaty's view of it being an institution that should "unite faith and knowledge, the divine and physical sciences," that of all sciences with biblical connections, botany did not take root in its soil.[14]

Besides the School of Philosophy, Catholic University also initiated a School of Technological Sciences to support studies in engineering and closely associated fields. Directed by Daniel W. Shea, Catholic's professor of physics who received B.A. and M.A. degrees from Harvard prior to earning a physics Ph.D. from the Friedrich Wilhelms Universität in Berlin in 1892, progress came slowly owing to a lack of faculty and apparatus, a situation in 1898 that prompted Shea to report to the university's administration:

> Some very vigorous action must be taken in the way of securing additional teachers and equipment during the coming year, in order that the young men who are now here and who are likely to come may be properly trained.

As for the young men enrolled in his engineering programs Shea showed a certain satisfaction as those "entering this year have been much better prepared for our work than those who entered in previous years," and added "fifteen applicants were refused admission on account of insufficient preparation." In 1899 Rector Conaty replied to a prospective student saying that "the University is a graduate school" but helpfully said that "the department of Civil Engineering is the only one

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[14] Greene's career given a good overview in Harley Harris Bartlett, "The Botanical Work of Edward Lee Greene," *Torreya* 16:7 (1916), 151-175, his "fruitful" years at the Smithsonian described on pg. 173. That botany incurred little cost to Catholic University documented in Greene's 1902 response, see Greene, A Report to members of the faculty of Philosophy, Catholic University of America, as to its department of Botany, pgs. 3-4. Conaty's further remarks in op. cit. "Degrees Awarded: those who received the honors of the institution; Eloquent Remarks by the Rector, Bishop Conaty, and by Cardinal Gibbons," while Greene's library mention in op. cit. Holm, "The Earliest Record of Arctic Plants," 1. The revival of botany at Catholic University in 1930 told in "Botany begins at C. U.: rennaisance of noted department restores it to world-wide fame," *The Alumnus* 2:3 (1934), 11-12. The status and strength Greene's botany department at the University of California when he left in 1894 can be gleaned from the *Register of the University of California 1894-1895* (Berkeley: Regents of the University, 1895), 108-109, and in remarks from the California Academy of Sciences in W. G. Eisenhart, "In Remembrance," *The American Midland Naturalist* 4:7 (1916), 335-338. A 1904 editorial numbered Greene's valuable herbarium at "20,000 specimens" in encouraging "placing these valuable private collections in the custody of some public institution," see "Editorial," *The Plant World* 7: 6 (1904), 155. A thoughtful dialog about scripture and our agrarian plant realm found in Ellen F. Davis, *Scripture, Culture, and Agriculture: An Agrarian Reading of the Bible* (Cambridge: Cambridge University Press, 2009).

which would admit a student without an A.B. degree." Conaty knew this student and of his skill on a baseball field but cautioned that "athletics count for very little in the University as entrance conditions." Yet with all the discussion about graduate study, including the university's *Bulletin* publication touting the institution as being "devoted to graduate and professional instruction and research," just one graduate degree was conferred during the technology school's first decade of operation, an M.S. degree to Francis De Sales Smith in 1900. Further undermining this school's contention as a place for graduate instruction would be the 14 Bachelor degrees it awarded over the same ten year period – 8 B.S., 6 C.E. and 6 E.E. degrees – which no doubt proved satisfying, but palled against the degree output of Notre Dame's engineering departments that graduated 54 students during the same ten years including 40 C.E. and 8 M.E. degrees. For Shea's School of Technological Sciences these results offered scant evidence to refute the earlier 1884 *New York Times* article that a Catholic university scientific school "would hardly be successful."[15]

Shea's School remained stymied from the continued lack of teaching staff and other resources, a problem he reported yet again to the Rector in 1901 in the mildest of words: "there have been no changes in the corps of instructors during the year, and no additions have been made to the equipment." He also reminded Conaty that when Catholic first opened "great stress was laid upon the demand for scientific development" and now some of the university's

[15] Initially setup as the Department of Technology within the School of Philosophy in 1895, it gained independence in March 1896 as the Institute of Technology under Professor Shea, then renamed once more in 1898 as the School of Technological Sciences; *Eighth Annual Report of the Rector of the Catholic University of America* (Washington, D.C.: Church News Publishing Company, 1897) and *Ninth Annual Report of the Rector of the Catholic University of America* (Washington, D.C.: Church News Publishing Company, 1898), pgs. 44 and 34 respectively. Shea's sent his academic details to Rector Keane in a pre-hiring letter dated April 3, 1892, see CUAA, Keane Collection, Office of the Rector, file folder 2/142, box 2. Shea's 1898 report detailing unmet departmental needs and appraisal of current students appeared in *Ninth Annual Report of the Rector of the Catholic University of America*, 34. Conaty's reply to William Moroney of Rhode Island dated December 16,1899, held in CUAA, Conaty Collection, Office of the Rector, file folder 3/47, box 3; I found no trace of Moroney attending Catholic University in Civil Engineering or any other department. The university indicated being "devoted" to high level academics from the back cover of "Devoted to Graduate and Professional Instruction and Research," *The Catholic University Bulletin* 4:4 (1898). Degree data for 1895-1905 tabulated from institutional publications, including various Catholic University yearbooks and bulletins and Notre Dame annual catalogues. "The New University," *New York Times*, December 13, 1884, 4.

administrators felt "that we cannot afford to take a backward step, insomuch as our word is pledged to the public." In support of increased funding for his school, Shea said that "more enquiries from lay students come to the University concerning work in the Technological branches than in any other department" and in an internal report on how other Catholic University programs in the School of Philosophy "have drawn their students largely from the School of Technology." Along with external pressure from many Catholic parents who were "not rich enough to educate their children for professions, who can afford to have them trained as engineers," Catholic University continued to provide nominal funding for technology-related instruction at the graduate and, commencing formally in 1904, at the undergraduate level when economic realities forced Catholic University to allow enrollment from all classes of students. While Catholic University gave the appearance of being responsive to student aspirations and parental pressures when it came to teaching the technological sciences, Catholic's small number of graduates dented that reality when compared to the greater number of degrees being granted by a dozen or so existing Catholic institutions offering various engineering degrees; those institutions were the real collective crown of American Catholic higher education when it came to teaching technology subjects.[16]

Still, no little credit belonged to Shea in guarding Catholic University from taking any backward steps when it came to science and technology. Even if making forward progress

[16] Shea's 1901 one-page school report in *Twelfth Annual Report of the Rector of the Catholic University of America* (Washington, D.C.: New Century Publishing Company, 1901), 38. His additional comments appeared in the same document under the title "The School of the Technological Sciences," pg. 9. Shea's internal report dated February 1, 1901, to the Academic Senate, "Report of the Senate Committee on Technology," from CUAA, Conaty Collection, Office of the Rector, file folder 3/2, box 3, his remarks on pg. 3. Remark concerning Catholic parents from a letter dated May 23, 1903, from Philadelphia Archbishop Patrick J. Ryan to Rector Denis J. O'Connell, CUAA, as cited in C. Joseph Nuesse, "Undergraduate Education at the Catholic University of America: The First Decades 1889-1930," *U.S. Catholic Historian* 7:4 (1988), 429-451, pg. 435. Here Nuesse also supplies good background about Catholic's decision to formally offer undergraduate education and degrees; see pgs. 436-440. My helpful database of Catholic institutions tallies at least a dozen that were conferring B.S. and other engineering degrees at the turn of the century.

proved difficult at times, Shea, who took at $200/year reduction in salary when he moved from the University of Illinois to Catholic University, remained fully dedicated to the institution up to his death in 1930. In 1904 Shea told a newly arrived engineering student, who assumed "Dr. Shea" was a physician, that, in contrast to the Rector, he did "fancy the idea of undergraduates at the University" as it was the "only way out of its present [financial] difficulty," thus responding with a sense of realism to current practical concerns. Two years later in 1906 the university reorganized Shea's and several closely related science departments from Catholic's school of philosophy into a new "school of sciences" that proved more efficient and better aligned with the new emphasis on undergraduate teaching. This School would publish its own *Announcements* catalog starting in 1907, a strategy that slowly began to pay off when contrasting 1907 and 1911 enrollments of five doctoral and 14 baccalaureate degree students versus eight and 57 students respectively. This fourfold growth of undergraduate students set against a modest increase of graduate degree seekers underscored how Catholic University pivoted away from its original mission of graduate education to offer a more commonplace science and technology curriculum much like many other Catholic colleges of the day, a mixed blessing to say the least. A related ambiguous outcome would be the graduation of the Rev. Thomas Frederic McKeon who in 1907 earned the first engineering-related Ph.D. at Catholic when he completed a dissertation on ionization variations of air. While a long-awaited moment for Shea in producing this doctoral milestone, regrettably, McKeon, possessed much needed expertise in other subjects besides science and would teach the modern languages, mainly Spanish, for most of his academic career in Catholic education.[17]

[17] In a letter to Rector Keane dated September 6, 1895, Shea disclosed his $2200/year salary at Illinois and indicated that $2000/year "would not deter me however from coming to Washington;" from CUAA, Keane Collection, Office of the Rector, file folder 2/142, box 2. Shea's passing on October 17, 1930, noted in *Annual Reports of the Rector and Treasurer to the Trustees, June 30,1931* (Washington, D.C.: Catholic University of America, 1931); also in "Dr.

McKeon was not the only disappointment at Catholic University in 1907. When financial issues at the institution compelled cost-saving measures, it decided to trim physics professor Albert F. Zahm from the science faculty in an action one student at the time described as his being "fired, that is, he was relieved of his duties." An early researcher in the young field of aeronautics who constructed the first scientifically instrumented wind tunnel situated on an American university campus in 1901, Zahm "got a new job at once with the United States Weather Bureau at higher pay." Hired in the 1890s when Catholic first struggled with funding, especially for equipment, Zahm used his own funds and "without expense to the University" to construct his "laboratory 30 x 80 feet, and equipped it with machinery and instruments, which equipment is now used by his students for original work in the preparation of theses," a laboratory mentioned prominently in Catholic's 1907 school of sciences announcements publication as being a "special feature" for "investigating the laws and phenomena of atmospheric resistance." Zahm, a Notre Dame graduate who went on to earn a M.E. from Cornell University and Ph.D. from Johns Hopkins, stood "first in the line of promotion" in 1906; instead, a year later he found himself discharged from an institution that could have used his scientific talents and professional connections in a promising new technological field. Even when the Catholic's funding situation

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Shea, Physicist, dies in 71st year," *New York Times*, October 18, 1930, 8. Frank Kuntz arrived to Catholic in 1904 and thought "I guess I have to take a physical exam" when directed to see 'Dr. Shea' the first time; see Frank Kuntz, *Undergraduate Days 1904-1908: The Catholic University of America* (Washington, D.C.: Catholic University of America Press, 1958), 10. The new School of Sciences degree offerings and requirements first listed in *Catholic University of America: Announcements of the School of Sciences 1907-1908* (Washington, D.C.: Catholic Unversity of America, 1907) and its early history described in *Catholic University of America: Announcements of the School of Sciences 1911-1912* (Washington, D.C.: Catholic University of America, 1911), 4. A few additional details about the new School of Sciences given in Colman J. Barry, O.S.B., *The Catholic University of America 1903-1909: The Rectorship of Denis J. O'Connell* (Washington, D.C.: Catholic University of America Press, 1950), 168-170. School of Sciences enrollment counts taken from its annual *Announcements* for 1907 and 1911, pgs. 38 and 54 respectively. About McKeon's dissertation (or in some places spelled McKeown or McKean), its title is *Diurnal Variation of the Spontaneous Ionization of Air in closed metallic vessels*, listed in *Doctoral Dissertations published by the students of Catholic University of America*, 15. His last position was at Notre Dame "as an instructor in Modern Languages"; his early life details, including his A.B. degree in 1902 from Notre Dame, provided in a death announcement, "Dies September 3," *The Notre Dame Alumnus* 28:5 (1950), 20.

improved four year later which resulted in the construction of a new engineering building equipped "with all the latest devices for the teaching of these sciences," this building served as a shared space for the school's engineering departments and the university's heating, light, and power plant, thus yet again figurative of the underfunded science education at Catholic University where science never enjoyed being in the vanguard.[18]

While the founding of Catholic University represented a unique response by American Catholics to the perceived need for a nationally eminent educational institution, its early struggles matched what other Catholic colleges previously endured in gaining a foothold and achieving long-term viability. Usually, Catholics established new institutions based less on their form, such as a flagship university like Catholic University in Washington, D.C., and more on the basic local needs to be served. Whereas the previous sections of this chapter considered different responses by two Jesuit colleges and Catholic University to a common need to teach science, the next sections explore responses from non-Catholic institutions to nearby thriving Catholic institutions which had shown themselves particularly adept in or alert to teaching science. These reversed comparisons offer a unique way to perceive science in American Catholic higher education from an inverted view given that these successful Catholic institutions

[18] McKeon's Ph.D. degree from the school of science was one of the first to be listed in "Winners of Degrees: List of Graduates of Catholic University," *Evening Star*, June 6, 1907, 12. Catholic University's most vexing financial crisis given a full chapter in Barry, *The Catholic University of America 1903-1909: The Rectorship of Denis J. O'Connell*, 71-108 (Chapter 3). Zahm's departure from Catholic and subsequent hiring by the U.S. government recollected by one of his students, see Kuntz, *Undergraduate Days 1904-1908: The Catholic University of America*, 138. Typical news about Zahm's work regarding aeronautics in "For Aerial Flight: Experiments by the Catholic University," *The Evening Star*, October 28, 1905, 14. Zahm's self-description of his wind tunnel build at no cost to the University found and his other scholarly achievements attached to a letter dated April 19, 1906, to Rector O'Connell, for him to have "on file" in matters of promotion, Albert Francis Zahm File Folder, CUAA. Following Zahm's death in 1954, he bequeathed the University of Notre Dame $225,000 with the stipulation that income generated from $100,000 of these funds be used to support Notre Dame graduates in doctoral studies at Catholic University, see "Money for Notre Dame," *The Catholic Standard and Times*, January 25, 1957. The new Engineering Building discussed in "University Chronicle: The Engineering Building," *The Catholic University Bulletin* 17:6 (1911), 617. It was first proposed in 1896 when Catholic University "decided to establish an Institute of Technology"; see "University and Educational News," *Science* 3:67 (1896), 558.

likely displayed a less defensive stance in making their academic ambitions, amenities, and accomplishments visible.

College of California's reaction to Santa Clara College

Established in 1851, Santa Clara College in California promptly declared itself "a favorite abode of science, morality and religion, in no way inferior to any other Institution for the education of youth." This claim, which appeared in the school's first published catalogue in 1855, was based on a curriculum granting ample attention to science, having the Jesuit and lay faculty to teach the diverse sciences, including mineral assaying, a subject very appropriate to the needs of gold rush California, and possession of an impressive set of natural philosophy apparatus from Paris to use in classroom instruction. Moreover, the expanding California population, fueled by the gold rush and subsequent statehood status in 1849, produced so much demand for higher education that the Jesuits opened a second school, St. Ignatius, 50 miles to the north in San Francisco in 1855. Both institutions quickly secured charters to grant degrees with Santa Clara awarding its first B.A. and B.S. degrees in 1857 and 1859 respectively with St. Ignatius following suit in 1863 and 1875. In response to these blossoming Catholic educational footholds, local non-Catholic religious leaders would act to establish a competing Protestant institution of their own.[19]

In 1853 Protestant ministers Henry Durant and Samuel H. Willey had teamed up with to open a small academy in Oakland, California, a location across San Francisco Bay and safely distant from the rival Jesuit colleges. The new school commenced with an intake of just three

[19] *Prospectus of Santa Clara College, with a catalogue of the officers and students for the year 1854-5*, 4. Details about St. Ignatius College, including a list of its first graduates, found in Riordan, *The First Half Century of St. Ignatius Church and College*. A more recent history of St. Ignatius, now known as the University of San Francisco, is Alan Ziajka, *Legacy & Promise: 150 years of Jesuit Education at the University of San Francisco* (University of San Francisco: Association of Jesuit University Presses, 2005). Both Santa Clara and St. Ignatius colleges receive attention in Weismeyer, "Science Education in Early California Colleges, 1850-1880," chapter 2.

pupils in contrast to the 85 then enrolled at Santa Clara, but its incorporation in 1855 would quickly bring the academy's enrollment up to 60 (though still half of Santa Clara's count). Willey deemed the academy "popular, well conducted, and self-supporting" and it would expand again in 1859 with the addition of a collegiate course that offered a B.A. degree. Advertised as a non-sectarian institution, religion remained the anchor of this college "designed by its founders to furnish the means of a thorough and comprehensive education under the pervading influence and spirit of the Christian religion." Even so an 1860 fundraising circular written by Martin Kellogg, a protestant minister who in 1861 would become one of the college's two fulltime faculty members, made clear that this "spirit of Christian religion" did not embrace Catholics or their schools. "The Christian forces of the state are yet comparatively small," wrote Kellogg who went on to advocate that "Protestants on the Pacific coast must provide instruction for their own sons." His reason for this stance was that "The Papists understand the power of educational influences"; "They have a well-endowed institution at Santa Clara which attracts many sons of non-Catholic parents." Yet his tone represented not a complaint, but only that as Protestants they "must be *able to compete* with the wily, tireless Jesuit." The Rt. Rev. William Ingraham Kip, bishop of the California diocese, added his voice to Kellogg's circular in an addendum by worrying about "the Romish Institution at Santa Clara, and until we present some inducements to parents, many Protestants will continue to send their children to that place." Apparently lost on Kip, Kellogg, and others connected to the fledgling College of California was that Santa Clara College cultivated it attractiveness to parents and students by making "that place" a "favorite abode of science."[20]

[20] An abundance of details about the College of California and its predecessor academy can be found in Samuel H. Willey, *A History of The College of California* (San Francisco: Samuel Carson & Co., 1887); initial enrollment count noted on pg. 35; incorporation mentioned on pg. 12; its enrollment in 1855 and Willey's view of the school on pg. 15. An example of a newspaper article that 'advertised' the college's particular religion emphasis, see

Meanwhile, on the west side of San Francisco Bay, the 1860s found Santa Clara and St. Ignatius colleges prospering and their annual commencement ceremonies usually replete with some form of scientific demonstration. On June 30, 1863, when St. Ignatius awarded Augustus J. Bowie the college's first A.B. degree, the commencement program included "Experimental Illustrations in Chemistry . . . by the students of the class" along with the expected speeches and music. At Santa Clara's annual commencement in 1864 a student "Lecture on Galvanism" received strong praise "as the most interesting feature of the exhibition" as recounted in a local newspaper. In contrast, the June 1, 1864, commencement celebrating the College of California's first four graduates had no scientific presentations on the program and the student orations touched not on science but on traditional religious or education-related themes of *Natural Revelation*, *Soul Power*, *Alma Mater* and *The Scholar*. Thus, for the College of California little science within prompted little science without given the eventual careers of these earliest graduates: two became ministers, one a local businessman, and one a teacher. By way of comparison, Bowie, having learned mineral assaying in college, continued his education in this field with two years of study at the Royal Academy of Mining in Freiberg Saxony, Germany, putting his advanced knowledge to work in the California and other western gold fields from which he wrote a well-received technical treatise on hydraulic mining. In gauging the academic priorities for these institutions based on their graduates, plainly the Catholic colleges with their

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"California College," *Nevada Journal*, December 2, 1859, pg. 2; apparently it was needed to re-explain this position, see "The College of California," *Sacramento Daily Union*, April 2, 1860, pg. 3. Weismeyer devotes part of a chapter to this college, see Weismeyer, "Science Education in Early California Colleges, 1850-1880," chapter 5. Kellogg's appointment as the college's professor of mathematics mentioned in Willey, pgs. 56-57. His circular: Martin Kellogg, A Statement in behalf of the College of California, Vernon, Conn, 1860, italics in the original.

"wily and tireless" Jesuit instructors outcompeted the College of California when it came to teaching science.[21]

The College of California yielded 23 graduates before succumbing to financial problems in 1869. While perhaps becoming "honorably known among the young institutions of the country," funds to keep it operational repeatedly failed to materialize, particularly to provide for teaching science as the college knew that "natural science is where we should make immediate efforts to increase the advantages of the institution." This disadvantage in teaching science could not be covered up by placing constant emphasis on religion, not in a state like California with a growing population and economy following the Civil War. Given its struggles and poor prospects for the future, that the college's trustees agreed in October 1867 to transfer the institution to the State of California, including its undeveloped land located north of Oakland in what would become Berkeley. In 1869 the College of California became the new University of California which would enjoy ample funding assured by the 1862 Morrill Act that allowed the university to catch up and surpass Santa Clara and St. Ignatius in the production of B.S. degree graduates. As to the one-time priority of religion, this was quietly sacrificed by the College of California trustees which left students at the University of California having to be satisfied in

[21] Programme of the Exercises at the Fourth Annual Commencement of Saint Ignatius College, S.J., June 30, 1863, from 1863 Prospectus of Saint Ignatius College, S. J., San Francisco, Cal., USFA. "Commencement of Santa Clara College," *Daily Alta California*, June 29, 1864, pg. 1. Names of the College of California students graduating at the 1864 commencement and their talks titles in Willey, *A History of The College of California*, pgs. 100-101. Bowie's mining background discussed in Mel Gorman, "Financial and Technological Entrepreneurs in the Black Hills: The San Francisco-De Smet Connection," *Huntington Library Quarterly* 45:2 (1982), 137-154, pg. 140, along with Bowie, *A Practical Treatise on Hydraulic Mining in California*. Given that the local Catholic archbishop, the Rt. Rev. Joseph Sadoc Alemany, officiated at Bowie's wedding, it is safe to say Bowie was likely Catholic; see "Wedding in High Life," *Stockton Independent*, January 8, 1869, pg. 1.

perhaps knowing that their institution's new location was named after the Anglican bishop George Berkeley.[22]

Given the extensive historiographic shade Protestant colleges have cast over institutions founded by Catholics and other religious groups, the chance to spotlight Santa Clara College as having a superior science curriculum versus the College of California holds special meaning in showing this one Catholic school not only being genuinely responsive to teaching science, but also serving as the exemplar that prodded a Protestant school to try and do better with its paltry science offerings. Next, I present another example of a non-Catholic school responding to the academic success and corresponding religious inroads achieved by a rival Catholic institution. This case pairs two Utah Territory academies whose co-development discloses a friendly, yet competitive relationship that not only offers an example of how science found a place at each school, but also usefully decenters Protestantism in studying American higher education.[23]

Catholic and Mormon schools in Utah

On September 6, 1875, St. Mary's Academy opened in Salt Lake City as "a select school for girls only" which would offer instruction "in all the ordinary branches of knowledge." Conducted by the Sisters of the Holy Cross, this new academy in the middle of the Utah heartland of the Latter-day Saints welcomed 85 students with the promise not to interfere "in the

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[22] The 23 alumni are listed in Willey, *A History of The College of California*, pg. 245. Willey's closing view of the college on pg.239 and his recommendation for the science department appear in his annual report for 1864-65, pgs. 123-127, quotation on pg. 124. The October 1867 trustees decision discussed in Willey, *A History of The College of California*, pgs. 209-213, while a more University of California historical view appears in Verne A. Stadtman, *The University of California 1868-1968* (New York: McGraw-Hill Book Company, 1970), pgs. 30-32. Stadtman also provides background on the Morrill Act mechanism that made major funding available to the planned University of California, pgs. 27-30. By 1900, Santa Clara College had awarded 161 B.S. degrees, St. Ignatius 56, and University of California 500; these numbers tallied from McKevitt, *The University of Santa Clara: A History, 1851-1977*, 326, Riordan, *The First Half Century of St. Ignatius Church and College*, 384, and from the *Directory of Graduates of the University of California 1864-1916*, 2-53. As to naming the undeveloped land destined to become the new University of California, see Stadtman, pg. 14.

[23] I respectfully use the terms 'Mormon' and 'Latter-day Saints' to refer to members of The Church of Jesus Christ of Latter-day Saints; the preferred full name as announced in August 2018 by church president Russell M. Nelson.

least with the religion of any one." Prior to the 1870s when the public schools for the Utah Territory were in effect Mormon schools given their population dominance, Catholic schools like St. Mary's Academy and other religious private schools began to appear as more non-Mormons moved into the territory, particularly men with families who worked in the mining industry and on the new railroads. No doubt alert to the situation and knowing how Mormon schools had lacked good teachers, the Catholic sisters made sure to advertise that their school would be:

> conducted by competent and experienced teachers from the east, who while sparing no pains or expense to make the secular knowledge equal if not superior to that imparted in similar institutions, will, moreover, pay special attention to the neatness, cleanliness, general deportment and morality of those committed to their care.

This direct challenge to the quality of Mormon schools would not go unnoticed. Shortly after her arrival to Utah in June 1875, Mother Augusta, the sister in charge of the new academy, enjoyed a cordial visit with Brigham Young, second president of the Latter-day Saints, who made no overt move to endorse the Sister's educational plans. Less cordial was a local Mormon bishop who, on the Sunday before St. Mary's Academy opened, announced "no Mormons would be permitted to send their children to the Sisters' school under penalty of being cut off from the church." Still the school did enroll a few young girls from Mormon families, but most students came from both local as well as distant Catholic families eager for their daughters to receive a good education.[24]

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[24] Quotations about St. Mary's appeared in a local newspaper article, see "St. Mary's Academy," *Salt Lake Herald-Republican*, August 27, 1875, pg. 3. Early history of public schools in Utah discussed in Frederick S. Buchanan, "Education among the Mormons: Brigham Young and the Schools of Utah," *History of Education Quarterly* 22:4 (1982), 435-459, esp. pgs. 439-441. Buchanan (citing Charles Peterson) also discusses the Mormon reaction to non-Mormon educators and their ideas, see pgs. 453-454 and footnotes 73-76. Sister Augusta's meeting with Brigham Young received a brief mention in Robert J. Dwyer, "Catholic Education in Utah: 1875-1975," *Utah Historical Quarterly* 43:4 (1975), 362-378, pg. 364. Helpful details about Sister Augusta found in Sister M. Georgia (Costin), "Mother M. Augusta (Anderson): Doing What Needs Doing," in Colleen Whitley (ed.), *Worth Their Salt: Notable but Often Unnoted Women of Utah* (Logan: Utah State University Press, 1996), pgs. 32-42. Mormon bishop pronouncement recalled in the *Centenary Chronicle of the Sisters of the Holy Cross: Volume 5, Our Western Province* privately printed, pg. 2, from Sister M. Georgia (Costin), pgs. 38-39, who notes that Mormons as well as Protestants were interested in the new Catholic academy, pg. 38. Dwyer explains how St. Mary's students were "drawn from families scattered over the general area but principally from the mining towns," see pg. 364. Andrea Ventilla, "The History of Saint Mary's Academy in Salt Lake City 1875-1926," *Utah Historical Quarterly* 80:3

On October 16, 1875, fifty miles south of Salt Lake City in Provo, Brigham Young signed over a deed for property worth $15,000 to seven trustees, six men and one woman, for the establishment of a new school with the name Brigham Young Academy. To be staffed by "an efficient corps of teachers," the school offered courses in "reading, penmanship, orthography, grammar, geography, and mathematics" and "other branches that are usually taught in an academy of learning" to both male and female students. Mormon families responded favorably with 70 students enrolled in the initial term that commenced January 3, 1876, a pleasing outcome in line with Young's desire that members of the church and their children should benefit from this new academy which was not an official part of the Mormon church. Unspoken was the recognized fear of Mormons sending their children to "finishing schools" outside of Utah where, as Young wrote in an 1875 letter to his son, there existed "pernicious, atheistic influences." Likewise, the prior arrival of Sister Augusta and the Catholic's successful opening of St. Mary's Academy no doubt helped to motivate the timing of Young's deeded gift and announcement of his new namesake academy as the Mormons, much like the Catholics, strove to offer educational opportunities for their respective religious flocks.[25]

(2012), 226-241 also mentions students came from outside of Utah to attend this academy along with the names of two Mormons who attended, see pgs. 231 and 232 respectively.

[25] A short report on the Brigham Young Academy appeared in *Biennial Report of the Territorial Superintendent of Common Schools, for the years 1874-5* (Salt Lake City: Deseret News Steam Printers, 1876), pg. 18, with details on the value of the property involved and the names of the seven trustees. Specifics about the deed and the lone female trustee, Martha Jane Knowlton Coray, with a brief mention of her background given in Ernest L. Wilkinson, et al., *Brigham Young University: A School of Destiny* (Provo: Brigham Young University Press, 1976), 47-49. October 16 would become known as Founders Day at this academy and later university. A brief mention of teachers found in "The Brigham Young Academy," *Salt Lake Herald-Republican*, November 30, 1875, pg. 3, while details about wanted courses are quoted in Ernest L. Wilkinson (ed.), *Brigham Young University: The First One Hundred Years* (Provo: Brigham Young University Press, 1975), 1:65. The academy's enrollment stated in *Biennial Report of the Territorial Superintendent of Common Schools, for the years 1874-5*, pg. 19. The worries about finishing schools appeared in the July 1872 minutes of the Utah Stake Bishops and Lesser Priesthood meeting minutes with related concerns appearing in Young's October 20, 1875, letter to his son Alfales; both mentioned and cited in Wilkinson (ed.), *Brigham Young University: The First One Hundred Years*, pgs. 1:59 and 1:67-68 respectively.

Enjoined by their respective religious communities to address unmet educational needs, Brigham Young and St. Mary's each soon came to grow along distinctive paths. Brigham Young expanded its curriculum to incorporate a separate 'Normal Department' for students aspiring to be teachers, which not only improved the academy's financial stability thanks to an annual appropriation from the county, it bolstered Mormon education generally. By 1884 this department had matured with students required to take four courses – preparatory, advanced, finishing, and practical – over two years, including gaining experience by teaching the academy's younger pupils. The leading Utah newspaper reported that year on how the "full Normal Department and all other departments" had "entered upon a new era of prosperity, as testimony that the Lord is sustaining the institution, and that Israel will support it for the good of the rising generation."[26]

St. Mary's Academy also prospered with enrollment topping 150 students as it celebrated its fifth annual commencement in June 1880. This well-attended event "made one thing very convincing that the sisters who are laboring in the academy are doing good work" and they continued to offer young girls in the originally promised education and more:

> Not only are the more intellectual branches taught, but instruction is giving in sewing, cookery, and even household duties, so that girls who graduate are women, so far as instruction can make them, and prepared to enter upon the realities of life, whatever may be their sphere.

Yet by 1884 the academy's curriculum broadened beyond domestic subjects to include scientific instruction when a local newspaper reported "the chemistry and philosophy classes are delighted with the complete apparatus for chemistry and philosophy received from the East last week." As

[26] *Circular of the Brigham Young Academy, Provo, Utah, for the ninth academy year, 1884-1885* ([Provo: Brigham Young Academy], 1884), 6. This newspaper article quoted from the report sent by the academy's principal, Karl G. Maeser, to the parents or guardians of its students, see "Brigham Young Academy Examination: Close of a Highly Successful Term," *Deseret News*, November 19, 1884, pg. 14.

for the other areas being taught, "the arithmetic, algebra, geometry, grammar and rhetoric classes seem all energy." For the Sisters of the Holy Cross these comments would have come as no surprise having replicated sciences and related instruction from its congregation's American motherhouse and school in South Bend, Indiana, adjacent to Notre Dame.[27]

Having secured stable footholds by teaching what was initially asked of them, both schools next manifested constant improvement as they amplified their educational offerings. Brigham Young placed weight on training teachers fitted for the largely Mormon Utah Territory while St. Mary's aimed for improved science in its offerings. By the early 1890s these patterns had solidified, and each school not only found a sustainable station in the Utah educational landscape they had found their physical and theological distance from each other gave way to more respectful views of the other. "The attitude of the Mormons was always friendly," a 1900 Catholic newspaper declared, while a Mormon paper from the same year expressed its view of St. Mary's as having "a right to be proud of the name she has so successfully acquired." Nevertheless, some variations remained when it came to teaching the sciences.[28]

To anyone familiar with Catholic educational norms, the June 14, 1890, evening commencement for St. Mary's Academy in Salt Lake City followed the customary pattern. Medals were awarded to the young girls "for excellency in the various departments," students

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[27] "St. Mary's Academy," *Salt Lake Herald-Republican*, June 25, 1880, pg. 3. "St. Mary's Academy: Synopsis of the Report for the Month of April," *Salt Lake Tribune*, May 4, 1884, pg.4. See chapter 2 where I discuss St. Mary's and its connection to Notre Dame when it came to teaching science.

[28] After Brigham Young died on August 29, 1877, his namesake academy did struggle financially for about 20 years, details in Jed L. Woodworth, "Refusing to Die: Financial Crisis at Brigham Young Academy, 1877-1897," *Brigham Young University Studies* 38:1 (1999), 70-123. These gracious remarks from "A Glance Backward of the Catholic Church and Her Western Pathfinders," *Intermountain Catholic*, July 28, 1900, pg. 1, and "St. Mary's Academy," *Deseret Evening News*, June 16, 1900, pg. 1. An overview of Mormon-Catholic relations found in Gary Topping, "Mormon-Catholic Relations in Utah History: The Early Years," *Utah Historical Quarterly* 81:3 (2013), 230-248. Issues between Mormons and Presbyterians apparently existed during this period, see R. Douglas Brackenridge, "Hostile Mormons and Persecuted Presbyterians in Utah, 1870-1900: A Reappraisal," *Journal of Mormon History* 37:3 (2011), 162-228, and chapter 6 in Robert Joseph Dwyer, *The Gentile Comes to Utah: A Study in Religious and Social Conflict (1862-1890)* (Washington, D.C.: The Catholic University of American Press, 1941), pgs. 151-189.

read their essays such as the one presented by valedictorian Miss Mamie Hunter titled "Observation and Science," along with the customary musical offerings and official speeches. Little would one think St. Mary's resided in a predominately Mormon county of 58,457 people where just 1,790 or 3% were Catholic for a school with 275 students. At the 1891 commencement, the school invited visitors to look around its newest building which offered on the second floor "a cabinet where in are arranged a splendid collection of minerals from the mountains around as well as a valuable collection of fossils" along with "the excellent sets of chemical and philosophical apparatus which the academy possesses." The following year the local newspaper suggested the public visit the school's classrooms and its "laboratories for the study of chemistry, physics, etc., [which] are the most complete of any in the city." At the end of the century this academy for young girls remained committed to the teaching of science as it gave "special attention . . . to physics, chemistry, astronomy, botany and geology." As an institution that would not transform into a degree granting college until 1926, this Catholic female academy took purposeful and more importantly visible steps to ensure its students studied the sciences as well as more traditional subjects.[29]

In contrast to St. Mary's as a female-only institution, Brigham Young Academy enrolled female and male students starting when it opened in January 1876, although its faculty and trustees would be mostly men. The academy's character as a normal school had long stood out

[29] A report on St. Mary's 1890 commencement along with end of the year enrollment details in "A Sense of Beauty: A Literary and Musical Feast at the Grand Opera House Last Night," *Salt Lake Times*, June 25, 1890, 8. Population details from the 1890 U.S. Census. The 1891 commencement described in "St. Mary's Academy," *Salt Lake Herald-Republican*, June 21, 1891, 8. An announcement of the school's opening for 1892-93 and its educational facilities noted in "St. Mary's Academy: A Strong Institution about to being another year of success," *Salt Lake Tribune*, Spetember 4, 1892, 5. The range of sciences taught by the end of the century listed in "St. Mary's Academy," *Salt Lake Tribune*, December 31, 1899, 11. The opening of the new college, St. Mary's of the Wasatch, announced in "St. Mary's of the Wasatch to open new building Sept. 13," *Salt Lake Tribune*, September 12, 1926, 2. More details about this new college and the Catholic Church in Utah found in Bernice Maher Mooney, et al., *Salt of the Earth: The History of the Catholic Church in Utah, 1776-2007,* 3rd ed. (Salt Lake City: University of Utah Press, 2008), pgs. 145-150.

with the aim of building up Church schools in the Utah Territory and elsewhere. "Supplied with a diploma from the Brigham Young Academy, a teacher can find ready employment in any of our schools," said an 1891 newspaper article, which expounded "it has been truthfully stated that a stranger can go into a community and pick out, by their deportment, the young men and women who have been students at this institution of learning." Earning a degree from this academy, such as a Bachelor of Didactics, meant studying a range of subjects, including topics in the natural sciences such as physiology and botany. For experienced teachers wishing to improve, the academy supported a program of study under a "Mutual Improvement" rubric established in 1891 through publication of a manual outlining lessons in theology, history, science, and literature. For one teacher, Carrie Olson from Sanpete County, science seemed to hold sway when she gave a talk on "Flowers" at the closing exercises at the academy in March 1892, but a report later that year put science in the minority of lessons assigned being only 24 out of a total of 216. Also in way of contrast was the number of lessons given to religious topics like the Old and New Testament - 86 lessons, or over three times the number allotted to science. This primacy of religion over science highlights how the academy worked to serve Mormon communities and their schools "designed from the first to be a Latter-day Saint school, conducted by teachers in the church, upon the principles of the church, and for the benefit of the children of the church." Science, while assigned an explicit place in the academy's curriculum and occasionally found itself put on public view, stood in the background. Unlike Catholic University of America and College of California which both suffered from too much religion, there was no such thing as too much religion at Brigham Young.[30]

[30] From Brigham Young Academy's first president, Warren N. Dusenberry, and continuing up to today as Brigham Young University, only men have led the institution. "The B. Y. Academy," *Provo Daily Enquirer*, March 23, 1891, 2, told of employment opportunities for Brigham Young graduates. A Bachelor of Didactics being awarded by the Normal Department shown in the *Circular of the Brigham Young Academy, and Latter-Day Saints Normal*

Young women such as Carrie Olson entered the Normal Department at Brigham Young Academy to improve themselves as teachers with a few finding science an appealing aspect of the curriculum. Given the opportunity, some were able to show off their learning on a public stage. In less open moments, however, science for young women found itself constrained by the priority given over to theology and church history. Talk titles listed in the minutes of the *Young Ladies Association* at Brigham Young Academy, a group founded January 18, 1893, with 41 members, reveal a basic pattern of essays read to the association rotating between religious matters and science. The first talks discussed faith (January 20) and the boyhood of Prophet Joseph Smith (January 23) prior to science gaining a turn when the human body and physiology were explored (January 24). Then it was back to religion with discussions of baptism, the Holy Ghost, and Joseph Smith. While rules for the association allowed membership to "any moral young woman over 14 years of age," there existed no explicit rules as to subjects for presentations, thus the group followed unspoken guidelines that aligned with their doing duty for the better of Zion, fulfilling their obligations for being women, and for living a correct life. Science subjects would rarely stray beyond basic health matters like physiology and hygiene with the records eventually showing a talk about a "Weather Report Lesson" on June 13, 1901. This quiet and restrained attention to science as seen through the lens of the *Young Ladies*

Training School, Provo City, Utah, for the Seventeenth Academic Year 1892-1893 (Salt Lake City: George Q Cannon & Sons Co., 1892), 10. Four fields of study for 'Mutual Improvement' listed in the *L.D.S Young Men's Mutual Improvement Associations Manual, 1891-92 (Part One)* (Salt Lake City: Published by Authority, 1891), 3. Science lessons begin on page 49 with the lesson 16 on 'Flowers' on page 52. Carrie Olson's science talk on 'Flowers' reported in "The B.Y.A. Class: Closing Exercises at the Academy," *Provo Daily Enquirer*, March 5, 1892, 1. Carrie was listed as a teacher in "Names of Teachers of San Pete Co. Utah," *Sanpete County Register*, December 25, 1891, 2. Number of the lessons studied and questions answered given coverage in "M. I. Normal Class at the Brigham Young Academy: Excellent Work Done," *Provo Daily Enquirer*, December 23, 1892, 1. Academy's aims laid out in the "Historical Review" section of *Circular of the Brigham Young Academy, Provo City, Utah, for the Thirteenth Academic Year, 1888-1889* (Provo: Enquirer Company, 1888), 5-6, quotation on pg. 5.

Association reinforces the previous notion that science occupied a subdued place within Brigham Young Academy in deference to religion, a deference not seen at St. Mary's Academy.[31]

Even if Brigham Young Academy failed to project a strong scientific character, the science it did offer came from well-informed instructors and the use of contemporary textbooks. Two teachers who received permission to leave the academy to study science at eastern universities came back not only with advanced knowledge in the sciences, but with new pedagogical ideas to better teach them. James E. Talmage studied chemistry at Lehigh University and Johns Hopkins in the 1880s before receiving a B.S. degree from Lehigh in 1891. His *First Book of Nature* published in 1888 provided the foundation for the science lessons in the schools "Mutual Improvement" program of study. Benjamin Cluff, Jr., earned a Bachelor and a Masters from the University of Michigan in 1890 and 1894 respectively with the latter degree in the educational sciences. Besides upgrading the overall scope of science at the academy, he transformed teacher training to be more scientific in its practices and, importantly, more aligned with secular education found outside of Utah, a no small matter given the territory's desire for statehood. Here stood an advantage the Sisters of the Holy Cross could not yet match as higher education for Catholic sisters at secular institutions did not begin until after the turn of the century. Although Brigham Young Academy placed a burning emphasis on religion in compliance with Brigham Young's earlier admonition "not to attempt to teach even arithmetic without the guidance of the Spirit of God," an unobtrusive spirit of science did flicker and flourish.[32]

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[31] Quotations from the minute books and other records preserved about the Young Ladies' Association, record group UA 201, BYUA.

[32] Under the "Sciences" Brigham Young Academy's 1892 circular indicated some of the books to be used: Avery's *Natural Philosophy* and *Complete Chemistry*, Deschanel's Physics, astronomy from Newcomb and Holden, or Rolfe Gillett, Martin's *Human Body*, LeConte's *Elements of Geology*, and Gray and Kellerman for botany; see *Circular of the Brigham Young Academy, and Latter-Day Saints Normal Training School, Provo City, Utah, for the Seventeenth*

Replication

Having only recently settled in the Utah Territory, Mormons erected *de novo* schools, academies, and other institutions to address the educational basics for their children. In contrast, the Catholic order that opened St. Mary's Academy in Salt Lake City, the Sisters of the Holy Cross, in essence replicated their established mother institution situated in South Bend, Indiana, which was already replete with the teaching of science. Not only were the Sisters well-disposed towards teaching of science, but most likely science-trained members would be selected to open and support this new distant venture. Thus, replication provided a mechanism for expansion as pursued by the various Catholic teaching orders which would convey particular curriculum emphases while maintaining fidelity to their Order's traditional rules and values. Still, any process based on tradition alone did not always ensure success where, as discussed in the previous chapter, adapting to new situations sometimes called for unconventional choices.

Academic Year 1892-1893, 26-28. On Talmage, see John R. Talmage, *The Talmage Story: Life of James E. Talmage - Educator, Scientist, Apostle* (Salt Lake City: Bookcraft, 1972) along with Julianna Bratt, "To Lay a Single Stone: A Preliminary Investigation of James E. Talmage as a Scientist and Museum Professional," BYU ScholarsArchive Library Research Grant 16, 2011. His 1888 book is James E. Talmage, *First Book of Nature* (Salt Lake City: Deseret News Company, 1888). About Cluff, see Brian Q. Cannon, "Shaping BYU: The Presidential Administration and Legacy of Benjamin Cluff Jr.," *Brigham Young University Studies* 48:2 (2009), 4-40, Thomas W. Simpson, "The Death of Mormon Separatism in American Universities, 1877–1896," *Religion and American Culture: A Journal of Interpretation* 22:2 (2012), 163-201, and Keith Lowell Smith, "A History of Brigham Young University - The Early Years, 1875-1921," unpublished dissertation, 1972. Talmage and Cluff appear regularly throughout Volume 1 of Wilkinson (ed.), *Brigham Young University: The First One Hundred Years*. That the University of Michigan was thought a suitable institution for Mormons to study (not unlike Catholics from Detroit College), see the multi-part 1894 article by Richard R. Lyman, "The University of Michigan, Ann Arbor," *The Juvenile Instructor* (1894), 29:6; 265-69, 29:12; 361-365, and 29:14; 425-429. And like Catholics when sending their sons to secular institutions, Mormons worried about their possible loss of religion as they "come back in many instances with their faith weakened" said President George Q. Cannon at an annual conference in 1898; from report on *Sixty-Eighth Annual Conference of the Church of Jesus Christ of Latter-Day Saints* (Salt Lake City: Deseret News, 1898), 3-6, quotation on pg. 5. The Brigham Young quotation from the 'Historical' section of the *Circular of the Brigham Young Academy, and Latter-Day Saints Normal Training School, Provo City, Utah, for the Seventeenth Academic Year 1892-1893*, 7.

While things turned out well for St. Mary's in Salt Lake City, other Catholic institutions found their road ahead more challenging.[33]

Although the Jesuits enjoyed a clear internal organizational uniformity derived from the rules and dictates of their *Ratio Studiorum*, external circumstances often fell short of the same consistency, especially when it came to matters of state charters. For Santa Clara and St. Ignatius colleges in former Mexican California where Catholicism historically ran deep, obtaining charters to confer degrees proved uncomplicated, especially given the attention these colleges allocated to science. Yet for the Jesuit's College of Las Vegas in New Mexico, despite residing in a Catholic friendly territory, an anti-Jesuit governor would veto the college's legislatively approved charter, leading the school in 1887 to remove to neighboring Colorado where it quickly received a charter which allowed it to resume offering courses of studies that emphasized science, commercial, and other practical subjects. While described as an institution "which has played so important a part in the educational interest of this territory in years past," the college, founded in 1877, had little choice but to relocate to a friendlier location in response to continuing anti-Jesuit barriers. By 1890 the college, now called the College of the Sacred Heart and no longer restrained from the conferring degrees given its Colorado charter granted in 1889, quickly began awarding both B.A. and B.S. degrees. The B.S. degree first appeared in the college's 1881-82 catalogue "owing to the special requirements of this Territory" and demanded "two additional years at the College in the further study of Physics and Chemistry, and of Geology, Mineralogy, Higher Mathematics, Astronomy, Logic, Metaphysics and Ethics." With

[33] The initial staffing of St. Mary's included at least one lay instructor, Miss Rose Devoto, an 1874 graduate of St. Mary's College in South Bend, who taught "very successfully a large class of vocal and instrumental pupils . . . for two years." See the note about Miss Devoto in "Saint Mary's Academy," *Notre Dame Scholastic* 12:6 (1878), 96. Like Bernard J. Reid at Santa Clara College in California (see chapter 2), lay instructors, especially those educated in a Catholic tradition, proved helpful during the early years of a new school when it came to staffing.

regular displays of science at annual commencements by students, a practice the college maintained after moving to Colorado, and a curriculum responsive to teaching the many sciences from its earliest years, the college's relocation, although a prudent decision, left an inopportune void in the educational landscape for New Mexico residents.[34]

For Holy Cross College, a Jesuit institution that opened in 1843 in Worcester, Massachusetts, the denial in 1849 of a charter by the state legislature owing to its anti-Catholic temper brought about a solution opposite in design to the one followed the College of Las Vegas. Holy Cross remained in Worcester, but 'moved' its graduates to Washington, D.C., where it exploited the 1815 Federal charter granted to Georgetown University to award them their Holy Cross degrees. This solution remained viable until 1865 when Holy Cross reapplied for and received a charter from a friendlier post-Civil War legislature. Of the 44 Holy Cross graduates who received A.B. degrees during these 16 years, the majority joined the clergy or practiced law with only two who took up employment in a scientific field as physicians, an unsurprising outcome owing to Holy Cross' firm commitment to the Jesuit classical curriculum in its most

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[34] The religious landscape of the New Mexico Territory assessed by Frances Campbell, "Missiology in New Mexico, 1850-1900: The Success and Failure of Catholic Education," in Carl Guarneri, et al. (eds.), *Religion and Society in the American West* (Lanham: University Press of America, 1987), 59-77, esp. pgs. 61-70. Anti-Jesuit details found in Edmund Verdieck, et al., "No Strangers to Adversity: The Jesuits of the New Mexico-Colorado Mission," in Thomas J. Steele, S.J., et al. (eds.), *Seed of Struggle/Harvest of Faith: The Papers of the Archdiocese of Santa Fe Catholic Cuatro Centennial Conference* (Albuquerque: LPD Press, 1998), 415-429. News of the college's move to Denver and associated description from "Rough on Vegas: The Jesuit Brothers' College to be transferred to Denver," *The Santa Fe New Mexican*, June 21, 1887, 3. Two Jesuit reports on the articles of incorporation issue and tensions with the territorial governor, Samuel B. Axtell, found in "*Las Vegas College, New Mexico*, and *Varia*," Woodstock Letters, 7 (1878), 40-43, 132-133. College of the Sacred Heart empowered to confer degrees on April 1, 1889, and at its thirteenth annual commencement on June 23, 1890, it granted four A.B. and six S.B degrees; see *Catalogue of the College of the Sacred Heart, Denver, Colorado 1889-1890* (Denver: C. J. Kelly, Book and Job Printers, 1890), 1, 52, and 54-55. Description of the B.S. from *Catalogue of Las Vegas College, Las Vegas, N.M. 1881-'82* (Las Vegas: Rio Grande Printing Office, 1882), 3. According to the above mentioned June 21, 1887, newspaper story, the Christian Brothers college in Santa Fe, founded in 1859 and having received a charter in New Mexico in 1874, planned to fill the void left by the Jesuit by taking "steps to double the capacity of their fine educational institution there." College of the Sacred Heart became Regis College in 1921 and 70 years later Regis University; that history is told in Harold L. Stansell, S.J., *Regis: On the Crest of the West* (Denver: Regis Educational Corporation, 1977). A history of Catholic education in Colorado broadly considered provided in William H. Jones, *The History of Catholic Education in the State of Colorado* (Washington, D.C.: Catholic University of America Press, 1955).

traditional sense where science was studied only in the final year. Though one advocate in 1849 who spoke in favor of granting a charter to Holy Cross and argued that the Jesuit college would "lay the broad foundation of a liberal education" including for "one who aspires to the walks of science," the careers choices of these early graduates point to science being of small importance. Considering this and the success of proxy graduations at Georgetown, no compelling reason existed for Holy Cross to consider relocation over denial of a charter given the college's curriculum was meeting expectations. Under these circumstances responding with patience proved altogether reasonable in keeping this institution located where it started.[35]

These two different, but eventually effective, forms of defiance exhibited in response to religious prejudice show how American Catholic higher education had become more resilient compared to Catholic colleges which failed earlier in the century. Holy Cross held tight to its advertised "plan of education . . . designed to prepare young men for an ecclesiastical, professional, or commercial state of life" while the College of Las Vegas relocated to another state where it could continue to teach a curriculum attentive to the sciences. Notably in the latter scenario an underlying mobility existed which facilitated the transference of an existing curriculum, that something more than the simple moving of textbooks and natural philosophy demonstration instruments to a new location functioned by way of a persistent mindset to resume teaching of science when the College of Las Vegas relocated to its new Denver home. This

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[35] Holy Cross charter difficulties explained in Kuzniewski, *Thy Honored Name: A History of The College of the Holy Cross, 1843-1994*, 70-76; its charter success discussed on pgs. 118-120. Names and occupations of the 44 graduates from 1849 to 1864 given in *Graduates of the College of the Holy Cross* (Worcester: Charles Hamilton, 1890), 7-8, where 20 became priests and 8 practiced law. "Natural Philosophy and Chemistry" appears in the seventh year of study at Holy Cross as seen in a typical catalogue of the mid-1850s; see *Catalogue of the Officers and Students of College of Holy Cross, Worcester, Mass., for the Academic Year 1856-57* (Worcester: Henry J. Howland, 1857), 4. This speech by Erastus Hopkins in support of a charter application from *Speeches of Mr. Hopkins of Northampton on the bill to Incorporate the College of the Holy Cross in the city of Worcester* (Northampton, Mass.: Butler & Bridgman, 1849), 21. That Georgetown University facilitated the granting of Holy Cross degrees is mentioned in Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 129.

attitude can also be seen behind the duplication of other Catholic schools in how they fostered teaching science in their curricula.[36]

Two examples serve my purpose here. St. Edward's College replicated in whole cloth its parent institution run by the Congregation of the Holy Cross order. Founded in 1881 in Austin, Texas, its first catalogue mentioned straightaway that its "system of instruction and discipline is that of the celebrated University of Notre Dame, Indiana," a depiction that persisted even 15 years later when a *Catholic World* article said, "this popular seat of learning grew out of the brain and heart of Notre Dame University, Indiana." Instruction in science carried over in the curriculum at St. Edward's, albeit it initially at a modest scale given the financial resources available to the young college. By the time the college received a state charter in 1885, its faculty remained small with just six Holy Cross priests and brothers to teach a course of studies giving "a finished education in commercial and classical branches" with students finding the commercial option attractive as they could earn a Master of Accounts degree in two years (versus seven for the classical course). Over 50 of these degrees would be awarded by the time St. Edward's conferred its first two B.A. degrees in 1896. Slowly the college's catalogues began to list specific faculty teaching physics and chemistry and in 1901 revealed a new four-year English-Scientific course although without any mention of a degree being awarded. This curriculum upgrade came about due to the arrival of a new president, the Rev. John T. Boland, who had graduated from St. Joseph's College, another Holy Cross college located in Cincinnati, and taught mathematics at Notre Dame shortly before his ordination in 1892. Deemed "popular and progressive," Boland elevated science instruction at St. Edwards even though its commercial

[36] Failed college mentioned in chapter 1 were St. Thomas in Springfield, Kentucky, and DuBourg's 'bad' school in St. Louis; named in chapter 2 were St. Charles College in Baltimore and St. Joseph's College in Philadelphia. Plan at Holy Cross listed in *Catalogue of the Officers and Students of College of Holy Cross, Worcester, Mass., for the Academic Year 1856-57*, 3.

course offerings continued in frontier Texas to draw the most students and it would be many years before the college awarded science degrees. Still, while St. Edward's science education productivity failed to keep pace with its parent institution, the college's culture and academic plans remained that of Notre Dame, including being an appropriate place for science.[37]

Another case showing the ups and downs of replicating the teaching of science appeared in how the Benedictines propagated colleges westward from St. Vincent's College, its home institution founded in Pennsylvania in 1846, to Minnesota and Washington. St. Vincent's gained a charter in 1870 with three courses of study – "ecclesiastical, classical, and commercial" – where "in all these special attention is paid to religious instruction" and would grant its first two B.A. degrees a year later. What modest science that existed at St. Vincent's would help Peter Engel, an 1876 graduate from St. John's College in Minnesota, augment his religious studies prior to ordination in 1878, and who then returned to St. John's to build up science teaching there and the college's eventual offering of a Bachelor of Science degree in 1896, something St. Vincent's did not offer until the middle of the twentieth century. In 1895 a new college, St. Martin's, would spring from St. John's when several Benedictine brothers separated to establish a new school near the capitol of Washington state. St. Martin's first prospectus touted this important lineage saying the school would be "conducted by Fathers of the Benedictine Order of

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[37] *Catalogue of St. Edward's College, Austin, Texas 1885-86* (Austin: Triplett & Hutchings, 1886), 5. Thomas O'Hagan, "In the Footsteps of Texas Missionaries," *The Catholic World* 71:423 (1900), 340-351, pg. 350. The college's two-page charter, signed on July 30, 1885, gave "general educational purposes" as the reason for the institution's formation; copy of original document in StEA. List showing faculty names found in the *1885-86 Catalogue*, pg. 3, course options on pg. 6, and name of the first Master of Accounts degree recipient on pg. 13. Names of the first two Bachelor of Arts degree recipients listed in *1895-1896 Catalogue*, pg. 38. The English-Scientific course first appeared in the *1901-1902 Catalogue*, pgs. 24 and 36-42. Boland's arrival and the new science course along with an overall history of the institution in William Dunn, *Saint Edward's University: A Centennial History* (Austin: Saint Edward's University Press, 1986), 124, 140; see pg. 141 about St. Edward's commercial course having "been the forte of the college." The above 1900 *The Catholic World* article called Boland "popular and progressive," and Boland's teaching mathematics at Notre Dame in *Forty-Eighth Annual Catalogue of the University of Notre Dame* (South Bend: Published by the University, 1892), 6.

the celebrated St. John's Abbey and University, Minn," in addition to announcing preparatory, commercial, and classical courses.[38]

By 1897 this original brief eight-page catalogue tripled in length as the college's director utilized "nearly all" of St. John's catalogue as he considered it "a model and comprehensive in everything." However instead of offering a science course that would lead to a B.S. degree, St. Martin's elected to offer a degree-less "scientific course" imagined as a "useful complement to a liberal education" for any students who "pursue the Classical or Commercial Course." In this way science at this new college fell in teaching priority versus its St. John's parent to something closer in line with its grandparent St. Vincent's. This curricular declivity suggests how teaching science remained contingent on local conditions despite the Benedictine disposition to teach according to their order's long-established rules, rules that helped all three institutions survive. Thus, by the time St. Martin's opened in 1895 on the far western frontier of the American nation a pioneering education (and religious) landscape no longer existed, and the college found itself responding to new conditions in which teaching science held a faded priority.[39]

Bachelor degrees for women

Towards the end of the nineteenth century, Catholic educators acknowledged a need to offer young Catholic women an education which would confer the Bachelor's degree at the

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[38] St. Vincent's details available in Jerome Oetgen, *Mission to America: a history of Saint Vincent Archabbey, the first Benedictine monastery in the United States* (Washington, D.C.: Catholic University of America Press, 2000). The college's 1870 state charter, course offerings, and June 28, 1871, commencement B.A. degree conferral found in *Catalogue of the Officers and Students of St. Vincent's College, Westmoreland Co., PA. 1870-1871* (Pittsburgh: Urben & Brother, 1871), 3, 22-23. See my chapter 2 for discussion about St. John's and Peter Engel. St. Martin's first prospectus comments from *Prospectus of St. Martin's College* (Tacoma: Pacific Printing Co., 1895), 3, 8.

[39] The 1897 science curriculum details given in *First Annual Catalogue of the Faculty and Students of St. Martin's College 1896-1897* (Collegeville, Minn: University Press Print, 1897), 9; the cloned format of this catalogue discussed in a (typed copy) of a letter dated March 29, 1897, from St. Martin's director Rev. Oswald Baran to (now) Abbot Peter Engel at St. John's in Minnesota. For an overview of St. Martin's history, see John C. Scott, O.S.B., *This Place Called Saint Martin's 1895-1995: A Centennial History of Saint Martin's College and Abbey, Lacey, Washington* (Virginia Beach, VA: The Donning Company/Publishers, 1996).

conclusion of four years of study. This credential had started to become required for anyone who wanted to enter teaching or other professional fields, thus attending a non-Catholic, perhaps a secular, institution offering such a degree was their only option. For this reason, in 1896 the College of Notre Dame in Maryland amended its original 1864 state charter to secure the right to award Bachelor of Arts, Science, and Literature degrees instead of the Mistress of English Literature or Mistress of Liberal Arts degrees it had granted. This response admitted to a sharp shift in female American Catholic higher education from one delivering an education meant for women who would likely oversee a home and family to one for those who wanted to pursue careers in fields and professions requiring specific academic qualifications. That the College of Notre Dame could offer science instruction with lectures from well-educated male Catholics such as the Rev. John J. Griffin who taught at Catholic University of America meant a Bachelor of Science or one of the other degrees from Notre Dame of Maryland conveyed respectable weight as a college-level credential.[40]

Framed as being "of the utmost importance in its bearing upon the higher education of Catholic women," the senior year for the first class of Bachelor degree candidates continued "the

[40] The first page of Notre Dame of Maryland's 1895-96 catalogue prominently reprinted in full the 1896 legislative act revising its charter with a specific mention of a "Bachelor of Science" degree among others; following this page appeared full details of the Regular, Scientific, and Literary courses of study; see *Thirty-Third Annual Catalogue of Notre Dame of Maryland, College for Young Ladies, and Preparatory School for Girls* (Baltimore: John Murphy & Co., 1896). The college's 1892 commencement offers an instance where a Mistress of Liberal Arts and Mistress of English Literature were conferred; see this event described in "Closing the Schools: Notre Dame of Maryland," *The Sun*, June 17, 1892, 8. This shift in American Catholic education well explained in chapter 1 from Schier, et al., *Catholic Women's Colleges in America*; chapters 3 and 7 provide further details about Notre Dame of Maryland and other American Catholic Colleges for women during this shift. Gleason looks at teacher education and the drift of Catholics toward secular education as reasons for this shift, see Gleason, *Contending with Modernity: Catholic Higher Education in the Twentieth Century*, 81-102 (Chapter 4), esp. pgs. 88-95. About the college's larger history, see Sister Mary David Cameron, *The College of Notre Dame of Maryland 1895-1945* (New York: The Declan X. McMullen Company, Inc., 1947), and Mary J. Oates, *Pursuing Truth: How Gender Shaped Catholic Education at the College of Notre Dame of Maryland* (Ithaca: Cornell University Press, 2021). Rev. John J. Griffin discussed earlier in this chapter. Last, the overall tone about collegiate education for Catholic women well captured in Mary J. Oates, "The Development of Catholic Colleges for Women, 1895-1960," *U.S. Catholic Historian* 7:4 (1988), 413-428.

gradual change from a curriculum drawn up on the well-known conventual lines to one possessing extension and breadth sufficient to satisfy the ever-increasing demand for higher education." That six graduates crossed the stage at their college's June 1899 commencement ceremony to accept their four Bachelor of Arts and two Bachelor of Literature degrees from Cardinal James Gibbons, Archbishop of Baltimore, not only validated the success of the School Sisters of Notre Dame in reinventing their institution as one better aligned with contemporary needs, it sent a message to other Catholic colleges for young women of the sanctioned way forward. Although the invited guest commencement speaker, Charles J. Bonaparte, said "not so very long ago a lady-bachelor would have seemed a contradiction in terms, and possession of a diploma almost implied the use of a razor," he went on to affirm that their degrees "[warrant] that you are worthy specimens of the best and highest product of Christian civilization." Besides this praise for the six graduates, no doubt the School Sisters enjoyed reading in the local newspaper positive remarks about their efforts and this outcome, and that "Notre Dame was in line with an innovation as usual, and one which gives promise of being taken up all over the country."[41]

It required another year before a Notre Dame student crossed the commencement stage holding her Bachelor of Science degree when Bertha L. Lobit garnered the first B.S. from the college in June 1900 having earned strong marks in physics, geometry, and astronomy. However, her B.S. degree turned out to be the only one that would be conferred under the college's new curriculum as Notre Dame abandoned its B.S. in favor of offering just the B.A.

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[41] While absent any student names, the article, "Candidates for Degrees," *The Sun*, September 10, 1898, 7, promoted these soon to be awarded Bachelor degrees from a Catholic women's college. 1899 commencement details appeared in "Notre Dame College: Cardinal Gibbons presides at its commencement," *The Sun*, June 15, 1899, 7, including the text of Bonaparte's speech concerning the bestowed Bachelor degrees. Bonaparte was Napoleon's grandnephew and an important Catholic layman. Additional remarks from "Degrees Conferred: Thirty-Sixth Annual Commencement of Notre Dame," *The Morning Herald*, June 15, 1899 (UMCPSP).

and B.L. where the sciences retained a place as optional elective subjects. Underlying this change appeared to be the School Sisters' efforts to gain 'registered' status for their college from the Board of Regents of the State of New York. Work along these lines began in 1895 when the B.A./B.S./B.L. degrees were first announced with the initial efforts taken to ensure the college's financial resources met a $500,000 minimum set by the New York Regents. In parallel over the next four years course requirements for each degree solidified into a curriculum that would meet with the Regents' approval in terms of course hours per week and appropriate staffing knowing that the Regents required "at least six professors giving their entire time to college and university work." By the time of Lobit's degree in 1900 there existed such a small difference between the B.A. and B.S. degrees vis-a-vis science content - 4 hours/week in mathematics for the B.A during the Junior year versus 5 hour/week for the B.S – it made little sense to offer a B.S. as a separate degree especially when in fact the B.A. would do, a decision relieving science-related teaching pressure from the college's limited staff as well. So while the College of Notre Dame of Maryland attained 'registered' status in 1902, it also partially broke the previously mentioned promise of offering innovative degrees for women, in this case the Bachelor of Science degree.[42]

Conclusion

By 1900 Catholics had opened over 200 institutions of higher education in the United States with about a quarter failing to thrive and soon closing. Another 25% would close in the

[42] Lobit's degree at the June 13, 1900, commencement announced in *Annual Calendar of Notre Dame of Maryland, College for Women and Preparatory School for Young Girls* (Baltimore, 1900), 51. Her course marks recorded in the annual Examination Numbers notebooks, Office of the Registrar box 1995-3386 for grades 1897-1922, NDMA. Absence of a Bachelor of Science degree option first seen in *Annual Calendar of Notre Dame of Maryland, College for Women and Preparatory School for Young Girls* (Baltimore, 1903), 6, and the first mention of 'registered' status with the Board of Regents of the State of New York on pg. 25. The completed four-year course layout for B.A. and B.S. degrees appeared in *Annual Calendar of Notre Dame of Maryland, College for Women and Preparatory School for Young Girls* (Baltimore, 1899), pgs. 11 and 12 respectively. The main rules being followed by the School Sisters to attain "registered" status found in the annual *Regents Bulletin*; for the year in which they applied and received this status, see *115th Annual Report of the Regents 1901 (Administrative Department)* (Albany: University of the State of New York, 1902), 184 and 257.

twentieth century. Despite these similar closure rates spanning over two centuries, failure to give adequate attention to the teaching of science was not a common cause of these closures. As explained in chapter one, new Catholic colleges founded in the early nineteenth century stood a better chance of survival if they allotted science a determined place in their curricula close to, if not higher than, the place given over to religion. Whether embedded in a classical course of studies leading to a bachelor's degree or a simple commercial diploma, students, as well as their parents, welcomed the practical benefits gained from science or science-related instruction during the first few decades of the new American republic. Simply stated, teaching science fostered stronger enrollments and gave a new Catholic school a better chance of survival. However, near the end of the nineteenth century this rationale appeared to fade as a necessity as new Catholic colleges either downplayed teaching of science, Seattle University being one example given at the beginning of this chapter, or expected another institution to attend to these demands, hopefully a Catholic one such as the newly opened Catholic University as noted with my Detroit College example. While neither Seattle nor Detroit colleges failed, neither did these institutions display any signs of improvement that would help set them apart from the many other colleges and universities operating in the United States by 1900, Catholic or otherwise. Indeed, here was evidence of serious shortcomings that supports the claim of American Catholic higher education faltering in an educational backwater even as it aspired to crown a new university in the nation's capital.[43]

What the Catholic University of America wanted to be and what it turned out to be sheds a harsh light on the place of science in American Catholic higher education. When the university opened in 1889 it rode a great wave of support to become the flagship Catholic educational

[43] These numbers per my database of Catholic institutions. For the 54 institutions closing before 1900, their average lifespan was about 13 years.

institution for teaching theology and science at the highest levels. But given the new institution's limited initial funding, instruction in theology began first with the sciences getting their turn some years later, a delay that seemed reasonable at the time. Yet by the time science courses would enroll their first students funding remained a problem and this made Catholic less than responsive to its professed desire to teach science. Astronomy, a scientific field long connected with Catholicism, fell to the wayside as the university lacked the resources needed for a research observatory competitive with the new Yerkes and Lick Observatories. Chemistry fared better, no doubt facilitated by having two Johns Hopkins Ph.D.s on the faculty, and this department would produce one of the first two science doctorate degrees awarded by Catholic University. The other early Ph.D. came from the botany department which necessitated little from the university in the way of resources as its one professor made available his excellent personal plant collection and reference library. But when the university made clear its view of the apparent disutility of botany the professor resigned from the institution, taking his library and collection with him. Catholic's engineering professor, who also held a Johns Hopkins Ph.D. found himself terminated as a cost-cutting measure even though his department garnered the most applicants, a surprising action given the institution had already begun accepting students for baccalaureate degrees to generate vital tuition revenue. Considered numerically, Catholic's spare performance during its first ten years of teaching science from 1895 to 1905 becomes unpleasantly obvious: only two Ph.D., one M.S., eight B.S., and six engineering degrees. In contrast over the same ten-year period Catholic's School of Theology awarded seven theology doctorates, Notre Dame in South Bend, Indiana, conferred 22 Masters and 72 Bachelor degrees (54 in engineering), and Johns Hopkins in its first ten years of operations, 1876 to 1886, granted

38 science doctorates. Catholic's paltry output did little to shroud this wide gap between its announced ambitions and actual performance when it came to teaching science.[44]

Three factors explain for this disappointing outcome. First, theology provided the underlying *raison d'être* for the founding of Catholic University and so enjoyed an advantage over science from the start despite proclamations about their having equal instructional status. Their inequality became apparent when science instruction commenced and meagre funding for buying required equipment drove faculty members like Searle, Greene, and Zahm to use personal resources for crucial items. Moreover, insufficient funds meant needed faculty for science instruction could not be hired, and later financial shortfalls led to highly qualified engineering professor like Zahm being dismissed. Religious instruction suffered none of these troubles given its negligible cost of instruction other than staffing. Second, this new institution implemented an implicit, yet major, structural change to American Catholic higher education in positioning Catholic University as the 'crown' over all their schools. Earlier John Henry Newman wrote in 1872 that "in the nature of things, greatness and unity go together; excellence implies a centre. And such...is a University," but with Catholic University not yet being great despite its self-imposed rank, especially in the sciences, absent was a centre of excellence that warranted the title of 'University." Looking at the institution's science degree production confirmed its underperformance, particularly when compared to other Catholic and non-Catholic institutions. And third, by the time Catholic University began to teach science in 1895 other Catholic academic 'crowns' already existed, colleges such as Santa Clara College and the University of

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[44] Number of Catholic University graduates determined from *Bulletins* and *Year Book* reports for 1895-1905. The count of Johns Hopkins doctorates taken from *Graduates and Fellows of the Johns Hopkins University 1876-1913* (Baltimore: The Johns Hopkins Press, 1914), 5-8. One comment: both universities stood equal when it came to the granting of Ph.D.s to women in a scientific field during the indicated respective time periods as neither institution had yet taken this particular step. Notre Dame University degree counts compiled from commencement programs listed in its annual catalogues. Kohler confirms Catholic's meagre output of Ph.D.s, see Kohler, "The Ph.D. Machine: Building on the Collegiate Base," , pg. 650.

Notre Dame, well-established institutions where science instruction flourished. Catholic, as a latecomer to graduate-level science teaching, offered little allure for students who wanted to study the *new physics*, the *new astronomy*, and other specialized fields in science that were already well ensconced at the University of Michigan, Johns Hopkins, and other institutions. While Rector Keane travelled across the country to recruit students for Catholic's theology school in the early 1890s, no such conscripting took place for Catholic's science departments once they opened in 1895. So, with only its religious brand for advertising, Catholic University stood little chance of attracting graduate or baccalaureate students given the competition coming from more mature and better-equipped Catholic, non-Catholic, and even overseas institutions.[45]

As I discussed in my first chapter, teaching science meant survival for new Catholic colleges and universities as those institutions that placed excess emphasis on religion at the expense of science put a young school at a serious risk of failing. Catholic University was too big to fail, but the weight and pride given over to religion overshadowed science instruction already starved of funding that resulted not only in the muted production of graduate-level science degrees, but a change of the university's primary purpose as a place of graduate-level only instruction to add on formal offering of undergraduate science degrees. This decision echoes my second chapter about 'constant improvement' where Catholic institutions learned over time to adjust their curricula to better confirm to actual versus expected demand, adjustments that were facilitated through the flexibility of local administrative control. Catholic University might have had the best intentions in hoping to be the overarching American Catholic institution teaching the advanced sciences, but quickly learned the reality of trying to achieve graduate education sans the required resources even though it possessed several science Ph.D.s

[45] Newman's remarks in chapter 2 of John Henry Newman, *Historical Sketches: Rise and Fall of Universities...* (London: Basil Montagu Pickering, 1872), 6-17, quotation on pg. 16.

on its faculty from Johns Hopkins and other well-regarded institutions. While Catholic University showed itself responsive to the 'new conditions' in wanting to teach the advanced sciences of the day, it did so ineffectively because it failed to recall past lessons available since the founding experience of Georgetown in 1789 where science and religion needed to be offered in balance in order for an institution to thrive.

Both science and religion animated early California colleges in varying proportions. While the two Catholic colleges enjoyed an advantageous head start on the College of California in opening first, it was the prominent place the Jesuits granted to science in their curricul that served well in bringing students into their classrooms and then across their commencement stages whereas religion played a less significant role given the school's regulation that "members of any religious denomination are received." In contrast the College of California placed more emphasis on religion starting with its formation in response to that "Romish Institution at Santa Clara" and continued this priority by mandating in its initial *Laws of the College* that students "attend divine worship on the Sabbath with some religious congregation." In 1864 when the college announced a new Mining and Agriculture College in its catalogue, this long-awaited science curriculum had to compete against the established classical course where "the study of the Bible will be pursued through the whole time." As with Catholic University of America, religion overpowered science at the College of California in alignment with the priority of its founders "to furnish the means of a thorough and comprehensive education under the pervading influence and spirit of the Christian religion." This priority granted to religion would fail to see College of California through to end of the 1860s.[46]

[46] Laws of the College adopted by the college's Trustees on December 15, 1859; they are listed in Willey, *A History of The College of California*, pgs. 59-63. The new Mining and Agricultural College announced in *Catalogue of the College of California and College School; Oakland, California 1864-65* (San Francisco: Towne and Bacon, 1864), pgs. 15-16; bible study mentioned on pg. 10 and Christian religion noted on pg. 12.

While thinly veiled anti-Catholicism proved unconducive to the long-term success of the College of California, this prejudice served to reveal how this one non-Catholic institution viewed itself being on the defensive against a neighboring Catholic college. That defensiveness provoked a response with College of California emphasizing religion as its core attractive element and failing to grant teaching science the priority it necessitated to be competitive with the nearby Jesuit school. This flipped the traditional historiographic script that typically situated Catholic higher education and its teaching of science on the defensive. Though of note is the way this script infers unilaterality as a tacit assumption with a simple one-way reaction of one school to another. Bilateral linkages were also possible as seen with contending Catholic/non-Catholic religious communities in Utah.

By the turn of the century Catholics and Mormons successfully inaugurated academies as means for giving their respective flocks access to higher education. Their diplomatic coexistence in the composite population comprising the growing Utah Territory speaks more of shared values if not educational interests, but with having simply different priorities when it came to teaching science to young girls. That Brigham Young responded to opening of St. Mary's Academy with a school using his name signaled an evident reaction to non-Mormon influence when it came to education of Mormon youth. In addition, by the early 1890s the well-developed normal school curriculum at Brigham Young Academy offered a *Ratio Studiorum*-like template for other Mormon schools, a valuable byproduct for Mormon education overall. Likewise, the Catholic Sisters at St. Mary's Academy responded to their Mormon neighbors with "their exemplary lives, their industry, their holy conversations, their solicitude and even love for the children and the good advices they give them, [as they] silently – but surely, not only removing all prejudices from their minds, but even gaining their respect and admiration!" And maybe a few conversions.

For two religious groups that had experienced the harsh pains and serious troubles of religious prejudice, both appeared to share the same educational imaginary to which teaching science occupied a small, but important, priority.[47]

Replication of an existing institution provided an efficient way for a Catholic order to establish a new school and teaching science figured into this work to varying degrees. For the Jesuits when faced with the denial of state charters for two of their new colleges, they elected to relocate their College of Las Vegas in New Mexico to another state so it could continue teaching a curriculum that strongly embraced the teaching of science in contrast to their decision to keep in place Holy Cross College in Massachusetts where advancing students to the priesthood held priority. Local conditions also modulated the end form and level of science instruction transplanted to the newly reproduced colleges of the Congregation of Holy Cross and Benedictine orders for St. Edward's College in Texas and St. John's College/St. Martin's College respectively. These instances help to confirm not only the presence of science in American Catholic higher education in addition to illuminating its portability and active circulation given the right circumstances.[48]

The College of Notre Dame response to teaching science in the late 1890s, that of offering a B.S. degree starting in 1895 and then eliminating it shortly after awarding just one in 1900, highlights the tensions facing Catholic women colleges in keeping up with their largely secular competitors and the accreditation framework each needed to navigate. This episode

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[47] Description of the Sisters at St. Mary's in the annual report written by Father Lawrence Scanlan October 12, 1876, about a year after they arrived from Indiana to establish their academy; see John Bernard McGloin, S.J., "Two Early Reports Concerning Roman Catholicism in Utah 1876-1881," *Utah Historical Quarterly* 29:4 (1961), 333-344, pg. 338.

[48] For a discussion of science and location, see Livingstone, *Putting Science in its Place: Geographies of Scientific Knowledge*.

represented a rare instance of a Catholic institution of higher education overcorrecting in adding science to its curriculum as it tried to find a balance between Catholic ideals regarding women's education and the emerging standards of American higher education. Yet little fault can be assigned to the School Sisters for their missteps as they had no American Catholic college examples to follow, as much like Father Carroll in the early days of Georgetown College in Washington, D.C., mistakes occurred as these respective institutions found their way forward to eventual good outcomes. And College of Notre Dame was not alone in retreating from offering a Bachelor of Science degree in the late 1890s as Mount Holyoke and several other female colleges went down this same path in constructing their respective curricula. In the end the College of Notre Dame became an influential example for the many female-only Catholic colleges founded in the early twentieth century whose numbers grew to match Catholic male-only colleges and then exceeded them by the mid-1920s. Science was an integral and intentional aspect to that growth.[49]

This chapter has shown how various Catholics 'completed and amended' their many colleges and universities during the nineteenth century. How they responded to the changing needs of their students, competition with non-Catholic institutions, financial issues, legislative barriers, and, for most of the institutions examined, the inherent desire to teach science depicted

[49] This balance receives attention in Schier, et al., *Catholic Women's Colleges in America*, 166-167. Discussion on the disappearance of B.S. degrees at non-Catholic women's colleges, including Mount Holyoke, in Oates, *Pursuing Truth: How Gender Shaped Catholic Education at the College of Notre Dame of Maryland*, 92-93. Further details about Mount Holyoke installing science in its curriculum during the 1890s in Charlotte King Shea, "Mount Holyoke College, 1875-1910: The Passing of the Old Order," unpublished dissertation, Cornell University, 1983, 176, and Miriam R. Levin, *Defining Women's Scientific Enterprise: Mount Holyoke Faculty and the Rise of American Science* (Hanover: University Press of New England, 2005). When the number of female-only Catholic schools exceeded the number of male-only Catholic schools in Claudia Goldin, et al., "Putting the "Co" in Education: Timing, Reasons, and Consequences of College Coeducation from 1835 to the Present," *Journal of Human Capital* 5:4 (2011), 377-417, pgs. 389-390, esp. Figure 1 on pg. 390. Concerning the School Sisters of Notre Dame's larger contribution to American Catholic education, including the College of Notre Dame, see concluding chapter in Sister Margaret Mary O'Connell, S.S.N.D., "The Educational Contributions of the School Sisters of Notre Dame in America for the Century 1847 to 1947," unpublished dissertation, Johns Hopkins University, 1950, 257-266.

mixed results. Considered broadly this outcome consisting of mostly partial successes confirms that the American Catholic higher education enterprise did stand in a 'backwater' at the turn of the nineteenth century. While Catholics believed in their institutions, much work remained to be done.

Map 5 – Locations of institutions mentioned in *Reconciling* chapter

Chapter 4: Reconciling

College must put man in touch with science illumined by faith
and with humanity ennobled and redeemed by Christ.

From the opening address delivered by the Rt. Rev. Mgr. Thomas J. Conaty, Rector of Catholic University, Washington, D.C., at the first annual conference of the Association of Catholic Colleges of the United States (Chicago, April 12, 1899)[1]

This chapter stands in complete agreement with the Rt. Rev. Conaty's 1899 view that a [presumedly Catholic] college needed to put its students in touch with science in a manner wholly appropriate to Catholicism. Over a century earlier the Rev. John Carroll, founder of Georgetown College, held a similar view when he declared that "the object of [his] proposed institution is to unite the means of communicating science with an effectual provision for guarding and improving the morals of youth." Broadly speaking, the teaching of science as modulated by religion represented nothing unusual over the one hundred years of American Catholic higher education surveyed to this point. Given the adjacency of religion and science as fellow travelers throughout a century of Catholic educational activity, this chapter explores their mingled status to understand the way reconciling played a role in their journey together. As two separate realms, something the 1907 *Catholic Encyclopedia* editors stressed by saying that "there is no specifically Catholic science," science and Catholicism each stood free to find their own place on the American Catholic campus.[2]

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[1] Conaty's talk was titled "The Mission of the Catholic University," see *Report of the First Annual Conference of the Association of Catholic Colleges of the United States* (Washington, D.C.: Catholic University Press, 1899), 21-38, 24.

[2] The Rev. Carroll's view appeared in a printed broadside dated 1787 announcing his proposed academy, GTUA. *The Catholic Encyclopeida and its makers*, iv.

Georgetown College established the initial footing for Catholic higher education in America and served as a prototype for subsequent institutions. Organized by then-suppressed Jesuits like John Carroll, his goal of 'communicating science' to students came easily given the obligation to teach science as stipulated in the Jesuit *Ratio* where science found itself securely reconciled with Catholicism. Critically Carroll's own Jesuit education in Europe during the post-suppression 1780s imparted a willingness to adapt the *Ratio*'s curricular prescriptions to unique American needs where science would be given elevated visibility to induce parents to send their sons to his new school at a time when offering a conventional classical curriculum had modest draw over more practical subjects. Carroll's position as Prefect-Apostolic of the American Catholic Church, his standing as a Jesuit, and his presidential authority over the new institution facilitated its strategy of granting science a more obvious place in its curriculum that, when tied to the college's policy of accepting students from all faiths, lessened any potential issues of religion and science. In this easy manner Catholic theology remained unharmed at Georgetown while teaching science enjoyed a practical boost to higher student enrollments.[3]

For students who attended Georgetown College in the early 1810s, science and religion required little if any reconciling as at least one of their introductory science books presented the world as one unified under God. *A New Treatise on the Use of the Globes and Practical Astronomy; or a Comprehensive View of the System of the World*, published in 1812 by Jesuit James Wallace, put students in touch with "the wisdom of the Creator in all the phenomena which nature exhibits" as it located religion as something that would "spare the mind of man

[3] The Jesuits and their 1599 *Ratio Studiorum* existed comfortably with Aristotle when it came to philosophy by the time of Georgetown's founding in the late eighteenth century, see Pavur, *The Ratio Studiorum: The Official Plan for Jesuit Education*, 99. These views underwent change when Thomistic philosophy entered Catholic philosophical conversations in the late nineteenth century, see Don O'Leary, *Roman Catholicism and Modern Science: A History* (New York: The Continuum International Publishing Group, 2006), 114 and 198.

from amusing itself with vain systems and philosophic dreams." For the most part Wallace's 512-page treatise addressed these aims uncomplicatedly as a practical text for classroom teaching about globes and astronomy with questions offered at the end of each subject section for students to answer. Yet its closing chapter on "The General Laws of Motion" offered a 24-page overview of Newton's laws of mechanics, a surprising nod toward, and perhaps endorsement of, a 'vain system' where Wallace foregrounded some of Newton's "Rules of Reasoning in Philosophy" in addition to various higher mathematics involving the use of fluxions. While the historian of mathematics Florian Cajori considered this work "in advance of any other American treatise on astronomy of its day," its sophisticated Newtonian contents in an otherwise basic student text does more than hint at the complex relationship between science and religion in a period of comparative calm between their given worldviews, or at least on American soil where, given Wallace's quoting Cicero on his book's title page "What greater or better gift can we offer the republic than to education our youth well?", weightier educational priorities existed.[4]

Not all textbooks by Catholic authors attempted to depict an overarching harmony of science and religion nor were authors always members of a Catholic religious order. At St. Mary's College in Baltimore layman Lewis M. de Chevigné taught mathematics for over two decades from 1802 to 1825. Remembered as a "pious" gentleman, he published in 1807 the first of his four volumes on mathematics "remarkable for [their] perspicuity and exactness" which contained only a few hints of religion in its introduction and the problems prepared for students.

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[4] Wallace, *A New Treatise on the Use of the Globes and Practical Astronomy; or a Comprehensive View of the System of the World*, 106 and 299; chapter on the general laws of motion pgs. 463-487. Comment about Wallace's book from Cajori, *The Teaching and History of Mathematics in the United States*, 208. I situate Wallace's book as evidence for the 'complexity theory' originally proposed by Brooke and later supported by Numbers; see John Hedley Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge: Cambridge University Press, 1991), and Ronald L. Numbers, "Simplifying Complexity: patterns in the history of science and religion," in Thomas Dixon, et al. (eds.), *Science and Religion: New Historical Perspectives* (Cambridge: Cambridge University Press, 2010), 263-282.

As explained in the book's overview Chevigné wanted "young learners" to study mathematics under a plan "wholly founded upon reason" that reified this "noblest prerogative of the human species above the brute creation." Later in the text appeared a problem asking how after the Great Flood Noah, his three wives, and their children could have repeopled the world such "that the population of the earth might amount to one million at the end of two hundred years?" His answer to this problem included apologetic comments of support noting that "the robust health, and the long days of our first parents, render sufficiently probable" this outcome. Moreover, Chevigné used his answer to chastise those who "deny that the earth could have been peopled in so short a time by a single man." Both Wallace and Chevigné fashioned textbooks not only appropriate to the needs of American Catholic higher education, in this case for teaching science and mathematics at the first two Catholic institutions founded in the United States, but textbooks clearly reconciled with Catholicism and its religious principles.[5]

Lessons taken from the Bible for use as mathematical questions persisted at St. Mary's when, for example, in 1824 students were given a less provocative examination problem to solve whether a drop of water falling from heaven to hell at a decreasing rate of descent would ever reach bottom. Whether these questions simply reinforced biblical accounts or more forcefully argued in support of religion, Catholic or otherwise given that not all students at Catholic institutions were Catholic, that the light of faith productively illuminated their curricula as well as the schools themselves proved helpful if not crucial when Catholics expanded their educational reach into Kentucky and beyond. More expediently a pathway to teaching science stood open to

[5] Quotations from the introduction and chapter on algebra in L. I. M. Chevigné, *Mathematical Manual for the Use of Colleges and Academies, containing four parts* (Baltimore: John West Butler, 1807), vol.1, iii-iv and 174-175. An obituary mentioned his being 'pious' along with the description of his four volumes; see "Tribute of Gratitude and Respect," *American and Commercial Daily Daily Advetiser*, April 19, 1826, 2. Brief remarks about Chevigné also appear in Herbermann, *The Sulpicians in the United States*, 106 and 110.

those schools that chose to embrace it and associated subjects to their advantage if not basic survival as described in my first chapter. American Catholic higher education expanded (with no few failures) over the nineteenth century with science teaching growing in scope and purpose as a productive complement to religion while at the same time being cautious in depth. In the rest of this chapter, I offer examples of Catholic institutions teaching science specific to these notions of scope, purpose, and depth.[6]

Growing in Scope

Enduring growth failed to materialize for Georgetown College after it conferred its first two B.A. degrees in 1817 when enrollment dropped from a then high of 119 students to an average around 50 over the following ten years. The uninspiring description of the college's curriculum as "the course of ordinary studies," text unaltered between its 1820 and 1829 prospectuses, which no doubt failed to induce students in attending the institution given it no offered sense of scope to what would be studied over the course of seven years. This stationary plan of studies, though aligned with Jesuit teaching tenets vis-à-vis their *Ratio Studiorum* meant to arouse in students a "desire to know their Creator," promised little more than awarding a Bachelor of Arts degree assuming the student had "made sufficient proficiency." Further study of "the higher branches of Mathematics and Natural Philosophy" enabled a student to "take the degree of Master of Arts." Although not at odds with religion, Georgetown's lackluster curriculum received no boost from religion, leaving the school content to let its Catholic values fulfill Carroll's original 1787 dictate for providing "the strictest attention . . . to the morals of the students." In contrast, St. Louis College pressed against its Jesuit educational conventions to

[6] Based on Luke 16:19-31, this water drop narrative became question #13 in *Appendix to the Mathematical Thesis; containing the several Problems which may be proposed for solution, At the Examination of the Year 1824*, SMC Record Group 3 Box 15, STMSUA.

expand its curriculum to deliver a new non-traditional course of study whereas St. John's College (now known as Fordham) applied religious sensibilities to terminate this same course twice at its institution, opposite strategies both used to attract prospective students.[7]

When St. Louis College opened its doors in 1829 it had no difficulty in attracting students given that it had followed the historical Jesuit policy of offering a tuition-free education. However, as enrollments continued to expand, the college's financial situation soon became a problem which compelled its president, the Rev. Charles Van Quickenbourne, in 1832 to seek authorization from the Jesuit General in Rome to charge tuition. This consent arrived the following year which ensured the college lived up to its 1832 state charter that placed priority on the "advancement of science and learning" along with not being "repugnant to the laws of the land, nor injurious to the rights of conscience." Not only did the Rev. Van Quickenbourne succeed in altering a time-honored Jesuit religious rule to secure financial stability for his college, he also challenged the Jesuit curricular norm to offer a much sought, but unsanctioned, Mercantile Course at St. Louis in addition to the customary classical course of studies. Both courses conveyed "science and learning" to students along with varying levels of religious contact depending on how many years they spent in study. Unlike Georgetown which struggled to add a basic book-keeping course to its curriculum in the early 1830s, St. Louis explicitly broke with tradition to put into place curricula appropriate to the needs of students living in the emergent American west along the Mississippi River.[8]

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[7] Georgetown enrollments for 1791-1889 in Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, Appendix A. Pavur, *The Ratio Studiorum: The Official Plan for Jesuit Education*, from "Rules for the Professor of Philosophy," 99. 1820 and 1829 prospectuses of *Georgetown College in the District of Columbia*, GTUA; only the 1829 prospectus had a clause about attending "to the morals of the students."

[8] More details about the early years of St. Louis College found in the opening of chapter 2. Quickenbourne's efforts concerning tuition discussed in Faherty, *Better the Dream - Saint Louis: University & Community 1818-1968*, 40-41. Text of the college's 1832 charter printed in *Laws of a public and general nature of the State of Missouri passed*

St. Louis College, or more correctly St. Louis University as titled in its state charter, became the first of more than a dozen Jesuit institutions to offer a mercantile or commercial course of study. Most often this course led to a certificate, sometimes a degree, or simply provided several years of a fundamental business education in a hospitable Catholic setting. However, one college, St. John's College at Fordham, New York, would be the first to purge the commercial course from its curriculum, not once, but twice. When the Jesuits took over St. Mary's College in Kentucky in 1845 and then transferred it to New York City with the name of St. John's College, its Jesuit rector, the Rev. Augustus Thébaud, promptly dismantled the school's commercial course calling it "an ugly feature of our institutions" given its unsanctioned status in the Jesuit *Ratio* Yet four years later the college restored this course given that it had become "the wish of parents or children, that their sons or wards should be fitted for commercial pursuits." This turnabout proved beneficial to the teaching of science when by the 1870s the B.S. degree would be awarded at the end of a now four-year course of studies. Yet in 1891, the school's Jesuit president, the Rev. Thomas Gannon, jettisoned the commercial course, boasting that his college "has at length rid itself of this demoralizing course which was generally rated as the 'Refuge of Idlers.'" Furthermore, he claimed "there are more serious thought and more mature development among the students; hence there will be more vocations to higher things" in what Gannon proudly considered as his "purely Classical College." By 1899 the course was restored once again, this time by Gannon's replacement, the Rev. Thomas Campbell, in pragmatic response to the need to offer "thorough training in all the branches of a complete business education" as well as diminished concerns over undue student sloth. For a second time

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between 1824 & 1836, 2:298-299. The Mercantile and Classical Department courses offered by St. Louis described in typewritten copy of its 1833 Prospectus, SLUA. Georgetown's struggles to introduce book-keeping and other elective courses noted briefly in Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 195-196.

Fordham provided an option allowing a student to study not only "standard business methods" but also "mathematics, history, English literature, modern languages, science, and philosophy" through its commercial course. It was the course that wouldn't die.[9]

Although Georgetown College offered a stable, if staid, classical curriculum as sanctioned by the Jesuit *Ratio Studiorum*, for St. Louis College these guidelines became an anvil on which to strike off in new non-traditional directions with the charging of tuition and adding a commercial course option with a modicum of science, allowing the college to remain financially viable and attractive to students. These same benefits accrued to St. John's College (along with the fifteen other Jesuit colleges with commercial courses), benefits which strategically expanded the scope of American Catholic higher education while remaining essentially reconciled with Catholic educational aims. Except, of course, when St. John's leadership deemed this commercial course 'ugly', the 'refuge of idlers', and more seriously that it was not the kind of course which would produce vocations to "higher things," a clear reference meaning the Catholic priesthood. Here stood a twice-temporary unreconciled conflict not with religion per se, but with a course of study deemed unproductive if not unsightly in the eyes of two of its presidents, no matter the course fully embraced science and mathematics along with other practical content. That St. John's for a while conferred a Bachelor of Science degree on students who completed its

[9] My Filemaker database of Catholic institutions reckons a total of seventeen Jesuit colleges offering a commercial course. Thébaud's contempt for the commercial course discussed in Herbermann (ed.), *Forty Years in the United States of America (1839-1885)*, 350; its revival noted in *A Catalogue of Officers and Students St. John's College, Fordham, New York 1849-50*, 23. The Rev. Gannon's comments appeared in a strongly worded letter of correction dated December 23, 1893, see "St. John's, Fordham, A Classical College: A Correction," *Woodstock Letters* 23 (1894), 126. Reference to the Bachelor of Science degree being an outcome for St. John's commercial course made in *Catalogue of the Officers and Students of St. John's College, Fordham, New York* (New York: Baker & Godwin, 1871), 11-13. Prior to Rev. Gannon's arrival, the commercial course received candid attention; see *Catalogue of St. John's College, Fordham, N.Y. City 1890-'91* (New York: The Advocate Press, 1891), 14-15. One year later with the Rev. Gannon as president, the course no longer showed; see *Catalogue of St. John's College, Fordham, N.Y. City 1891-'92* ([Fordham, N.Y.]: [The College], 1892). The commercial course reappeared in *Catalogue of St. John's College, Fordham, N.Y. City 1899-1900* ([Fordham, N.Y.]: [The College], 1900), 10, 40. Apologies to Jon Roberts for paraphrasing his article title: Jon H. Roberts, "'The Idea That Wouldn't Die': The Warfare Between Science and Christianity," *Historically Speaking* 4 (2003), 21-24.

entire commercial course validated its content if not its value. Ultimately the scope of science education at this one Jesuit school only temporarily contracted when Thébaud and Gannon abolished its commercial course, primarily a bureaucratic decision on their part, but one which left science and religion productively reconciled in the long run.[10]

Science gained a stronger presence in American Catholic higher education when colleges began to make a new scientific course of study available in addition to the conventional classical course. Not all Catholic institutions offered this new course, but for those that did they found it attracted students drawn to its practical nature and reduced (or eliminated) emphasis on study of the dead languages. Students on both courses generally took the same classes in mathematics, astronomy, natural philosophy, chemistry, geology, etc., along with the same teachers, thus ensuring uniform religious oversight. Despite their common science course content, students who completed the science course usually received a Bachelor of Science degree and not the Bachelor of Arts degree that was ordinarily conferred on classical course graduates. Santa Clara College epitomized this pattern when it awarded in 1859 the first B.S. degree by an American Catholic college and went on to bestow 161 B.S. degrees vs. 89 B.A. degrees by 1900, thus openly underscoring its claim to be a "favorite abode of science." Whether in the college's catalogue, in its classrooms, or on the commencement stage, science at Santa Clara and twenty-four other B.S. degree-conferring Catholic institutions enlarged the scope of American Catholic higher education, albeit with science situated in its own domain where it maintained a cordial association with Catholicism. An 1869 Santa Clara faculty meeting made this reconciled

[10] Left unexplored is a detailed study of St. John's College financial situation in 1845 and 1891 to ask how tuition revenue from commercial course might have factored into it being cancelled and then restored. Also, to ask if the sizeable donations received in 1891 and 1892, $5000 "to educate a student for the priesthood" and $1125 for "two students for the priesthood" respectively, may have played a part in Rev. Gannon's decision to terminate the course (tuition and board at this time was $300/year). Donation and tuition details for 1891 in the *Catalogue of St. John's College, Fordham, N.Y. City 1890-'91*, 87,9, and for 1892 in *Catalogue of St. John's College, Fordham, N.Y. City 1891-'92*, 87, 9.

relationship clear in that the "great end & purpose of our teaching is the Catechism, while the sciences are a means of attaining the teaching of the science of God."[11]

Yet this expansion of science-specific instruction added several new dynamics that put pressure on that friendly relationship. First, science became another factor in dealing with the challenges presented by non-Catholic colleges when, for example, a Protestant writer declared in his 1856 anti-Jesuit pamphlet that "We must build College against College" to avoid being overtaken by the recent growth of Catholic education in the American West. Thus, any Catholic weakness in teaching science at its new or old institutions became a weakness in Catholicism itself. Next, as science fragmented and settled into specialties, especially after the Civil War when science and technology made clear their usefulness, Catholic curricula responded in offering courses and more critically degrees specific to civil engineering, electrical engineering, telegraphy, etc. This utilitarian turn stood out at the University of Notre Dame which awarded its first B.S. in 1865, a M.S. in 1872, a C.E. in 1875, and an E.E. in 1897. These degrees were not meant to cast "shade on the time-honored and embellishing College Course," a Notre Dame student newspaper article noted in 1868 regarding the school's classical course, given "the enlightenment of the nineteenth century has called [these new science courses] into existence in all the principal colleges both in this and foreign countries." Nonetheless these new science degrees in effect did cleave Catholic education away from its centuries-old ideal of educating the whole person where they became a de facto elective system with science, and not religion, seeing greater urgency as an institutional mission. Last, calls from outside of American Catholic

[11] Santa Clara called itself a 'favorite abode of science' in its first prospectus, see *Prospectus of Santa Clara College, with a catalogue of the officers and students for the year 1854-5*, 4. Santa Clara degree counts obtained from McKevitt, *The University of Santa Clara: A History, 1851-1977*, 326. My database of Catholic colleges indicates 25 awarded B.S. degree with six also awarding M.S. degrees; see Table 4 in my Conclusion for details. the May 20, 1869, meeting minutes of the *Liber Consultationem Prefectorum*, SCUA, 4DB, pg. 22.

higher education began to appear during this time which emphasized this need to teach science. An 1871 article in *Catholic World* titled "On the Higher Education" said that "a Catholic must be a Catholic in science, history, literature, professional or mercantile life, politics, and all social relations, as well as in the profession of the creed and the reception of the sacraments," thus a need for curricula that gave equal attention to all these fields of potential study (with science listed first!). In 1882 Pope Leo XIII called for "young clerics be . . . better educated in natural sciences," an appeal reiterated six years later in an American Catholic quarterly framed as there has been "opened up to us a new Crusade" where a deeper study of science would serve as a remedy regarding apparent misunderstandings between science and religion. In an 1895 Encyclical Pope Leo XIII directly addressed "the Archbishops and Bishops of the United States" in speaking about the new Catholic University in Washington, D.C., and other "distinguished universities" he made clear that "An education cannot be deemed complete which takes no notice of modern sciences." Here stood a simple directive that science instruction be encouraged, not hindered, unreconciled religious objections left aside. In many instances, these dynamics lent support to the growth of science instruction in American Catholic higher education, although every Catholic college and university responded differently with the scope of some schools becoming more "complete" than others.[12]

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[12] Obvious fear of the Jesuits and their schools, Santa Clara College all but being specifically named, stands out in the screed by Edward N. Kirk, *The Church and the College: a discourse delivered at the thirteenth anniversary of the Society for the Promotion of Collegiate and Theological Education at the West, in the First Congregational Church, Bridgeport, CT., November 11, 1856* (Boston: T.R. Marvin, 1856), 29. Veysey identifies utility as one of the four 'rival conceptions of the higher learning' during this time, see Laurence R. Veysey, *The Emergence of the American University* (Chicago: University of Chicago Press, 1965), 57-120. "Progress," *Notre Dame Year*, May 2, 1868, 1,2. Bruce talks about how electives helped science expand its academic presence, see Bruce, *The Launching of Modern American Science 1846-1876*, chapter 24, "The New Education," 326-338. "On the Higher Education," *The Catholic World* 12:72 (1871), 721-731, pg. 728. An English translation of the *Etsi Nos*: Encyclical of Pope Leo XIII on *Conditions in Italy*, February 15, 1882. "The Weapons of So-Called Modern Science," *American Catholic Quarterly Review* 13:49 (1888), 335-344, pg. 343. An English translation of the *Longinqua*: Encyclical of Pope Leo XIII on *Catholicism in The United States*, January 6, 1895. Why Pope Leo made this specific comment about science education is something to unpack as part of a different project that looks at how science and the authority of science fit into the American Catholic issue of Modernism.

Growing in Purpose

As the scope of science within Catholic higher education expanded during the nineteenth century a consonant growth linked to the purposes associated with teaching science can also be observed. Two practical purposes have already been discussed, one being that the odds of institutional survival improved from the teaching of science and the other being how curricula with science content proved attractive to students, with both showing science and religion beneficially reconciled. As more kinds of purpose can be found in Catholic higher education which possessed these same beneficial qualities, their study will shed further light on how science found a productive place within Catholic education.

At its foundation the purpose of American Catholic higher education meant providing instruction appropriate to its students, the country, and to God while staying faithful to Catholic identity and traditions. Moreover, each student manifested this purpose in their own way as no fixed outcome was demanded or expected. That said, some outcomes proved more pleasing to Catholicism than others with the education of Sarah 'Seddie' Bingham of Indianapolis being one example. Raised Episcopalian, Seddie attended St. Mary-of-the-Woods Academy in Terre Haute, Indiana, a school founded in 1841 by the Sisters of Providence, and graduated in 1893. This school gifted her with admirable literary and artistic abilities along with evident knowledge of science, all which gained full expression in two-facing pages of a student notebook on astronomy featuring her drawings of Saturn accompanied by a multi-stanza poem put on exhibit at the 1893 Columbian Exhibition held in Chicago. Her poem conveyed joy from watching the night sky as "one by one the brilliant orbs came peering through the azure blue" and at the intense magnificence of God's universe existing harmoniously with natural law writing that "La Place's theory exemplified / Saturns's unfinished still." Bingham converted to Catholicism in

1892 and joined the community of sisters at St. Mary's, taking her vows in 1896 and then teaching in their novitiate until just prior to her death in 1899 at age 25. Together St. Mary-of-the-Woods realized its purpose when it helped Bingham attain hers.[13]

Præmiorum, or prizes, served a simple purpose in motivating students to do good academic work. Emblematic of the Jesuits as a pedagogical tool dictated by their *Ratio Studiorum* but utilized by many other groups involved in American Catholic higher education, these awards made public a student's strengths across the many subjects being taught in Catholic schools. Beyond the honor gained for winning a prize, the student usually received a small gift item as well. Yet sometimes these gifts also served a purpose as when Charles Wildenstein received a gold cross as the prize "for the best paper in physics and chemistry" at the Las Vegas College commencement ceremony on June 24, 1888. Demonstrably no unreconciled problems existed in gifting a religious symbol for good work in the physical sciences, yet symbolically a cross reinforced religion over science if not offering more encouragement of the former over the latter. Given Wildenstein's personal background that suggests he was not a Catholic, being given a gold cross, even if for good work in science, hinted at an institutional purpose involving more than purely academic motives.[14]

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[13] St. Mary-of-the-Woods Academy provided enough material to fill one alcove in the display hall area allocated to American Catholic education (Alcove #65), including student work in physics, geology, geography, arithmetic, as well as astronomy. See *Catalogue Catholic Educational Exhibit* (Chicago: La Monte-O'Donnell Co., 1893), 157, for details. The American Catholic exhibit given full description in *The World's Columbian Catholic Congresses: with an Epitome of Church Progress*. Regarding Laplace's theory, see Ronald L. Numbers, *Creation by Natural Law: Laplace's nebular hypothesis in American thought* (Seattle: University of Washington Press, 1977).

[14] Details about the Las Vegas College commencement from *Catalogue of Las Vegas College, 1887-1888, to be known henceforward as College of the Sacred Heart, Denver, Colo.* (Las Vegas, NM: Las Vegas College Print, 1888), 39 (commencement announcement) and 41 (Wildenstein's gold cross). Wildenstein's life in New Mexico offers no hints of his being a Catholic; he and his wife Mary Ann Dominy are buried in a non-Catholic cemetery, their parents immigrated from England and Germany also with no signs of being Catholic. His being born in the small city of Watrous, NM, 20 miles distant from Las Vegas College, suggests the college's convenient location played a role in his attending versus its institutional religion affiliation. As a Jesuit college, Las Vegas College followed the rules concerning prizes given in the *Ratio Studiorum*, see Pavur, *The Ratio Studiorum: The Official Plan for Jesuit Education*, 133-135 (Regulations for Prizes).

For James E. McBride, a student at Notre Dame University, Divine purpose made its way into the classroom where it occupied a superior, yet harmonious, place above science. His 1868 essay on crystallography spoke of how God "has left for us in the little crystal a noble lesson, and we would indeed be ungrateful were we to disregard it." According to McBride God created the universe full of his" teachings" where "He has placed the index of His great Book upon everything around us." When the Rev. Joseph C. Carrier, S.S.C., the school's professor of botany, minerology, and geology, graded McBride's essay, he had but one criticism, "very good but incomplete," perhaps a remark less critical of his student's writing and more reflective of man being destined to have imperfect knowledge of the world. McBride graduated in 1868 with a B.S. degree and, in a surprising turn owing perhaps to Divine purpose, law became his chosen profession where he enjoyed a lengthy career as "a widely known attorney" in Grand Rapids, Michigan. If Carrier felt that his purpose as a teacher suffered a letdown with McBride, a first-year student at Notre Dame, John A. Zahm, showed himself even more attuned to the perfect unity of religion and science and eager to learn science under Carrier's tutorage. While Zahm's later attempt to reconcile evolution and religion in his 1896 book *Evolution and Dogma* put him into conflict with the Catholic Church in Rome, Zahm's many years at Notre Dame as a professor and later as an administrator helped this school to develop a well-respected curriculum for science and engineering, subjects Zahm saw as reconciled with God's Divine purpose.[15]

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[15] McBride's paper in *Writing Specimens - Seniors 1867-1868*, ULDG W/6/1, NDUA. A Grand Rapids newspaper article telling of his death gives few details about McBride, see "First Police Judge, James M'Bride Dead: Attorney on Board of Education Fourteen Years; Active Almost to the End," *The Evening Press*, December 9, 1912, 9. His June 24, 1868, graduation where he gave a speech on "Science," received the First Silver Prize (2nd place) for the Scientific Course, and earned many premiums and other prizes in the sciences, all made known in *Twenty-Fourth Annual Catalogue of the Officers and Students of the University of Notre Dame, Indiana, for the academic year 1867-68.* (Notre Dame: Ave Maria Steam Power Press Print, 1868). Zahm's book Evolution and Dogma (John A. Zahm, *Evolution and Dogma* (Chicago: McBride, 1896) created conflict with Vatican officials who required Zahm to withdraw his book from publication; details about this episode in Mariano Artigas, et al., *Negotiating Darwin: The Vatican Confronts Evolution, 1877-1902* (Baltimore: The Johns Hopkins University Press, 2006). In 1874

Sometimes matters of purpose related to higher education didn't lead to answers or finding one's destiny, instead purpose simply led to more questions. For the Rev. Charles Coppens, S.J., professor of Medical Jurisprudence at John A. Creighton Medical College in Omaha, Nebraska, this suited him perfectly in his one-hour-per-week course given to third-year medical students about morals and medical practice where he would "urge your questions till I have answered them to your full satisfaction." Coppens published his lectures in 1897 stating in the book's preface that "it is high time" that principles of medical jurisprudence "be more generally and distinctly inculcated on the younger members and especially on the students of their noble profession. To promote this object is the purpose aimed at by the author." Beyond the classroom Coppens intended his book to have "a wide circulation among medical men and their students" as he had something "new" to say no matter how incongruous a subject coming from a Catholic priest with no formal medical training. Numerous histories praised Coppen's book as "the first American work in the morals of medical practice," "the first" special treatise about medical and nursing ethics, and "especially worthy of mention," comments validating that what Coppens taught in a medical school classroom ensured a minimal measure of Catholic moral principles reached this Jesuit university's medical students. In doing so, he made a fitting place for religion within the science of medicine.[16]

Zahm took over Carrier's position at Notre Dame when Carrier was reassigned to a new college in Texas, see John P. Slattery, *Faith and Science at Notre Dame: John Zahm, Evolution, and the Catholic Church* (Notre Dame: University of Notre Dame, 2019), 25-47, esp. pgs. 27-28 and 33.

[16] Coppens' position on the medical school faculty, details of the third year (of a graded four year) curriculum, and a description of his course of lectures in the catalog for *The John A. Creighton Medical College, Medical Department of the Creighton University* (Omaha, 1898). Book quotations taken from Charles Coppens, S.J., *Moral Principles and Medical Practice, The Basis for Medical Jurisprudence* (New York: Benziger Brothers, 1897), preface, 36. A May 25, 1897, letter from Coppens to Henry Brownson provided the addition quotations as it mentions the early variant of the book's subtitle: A New Aspect of Medical Jurisprudence, folder CBRH III-3-E, NDUA. Coppens being part of the Creighton Medical School stands out given that the Jesuit Constitution advised its members not to engage in the teaching of medicine and law given these subjects "being more remote from our Institute," see *The Constitutions of The Society of Jesus and their Complementary Norms: A Complete English Translation of the Official Latin Texts*, 180. Praise for Coppens' 1897 book from David F. Kelly, *The Emergence of Roman Catholic*

In 1848 Georgetown College conferred the Bachelor of Arts degree on Edmond Reuel Smith after having put him in touch with science along with fostering his obvious talent in drawing and other arts. A telling example of his various abilities appeared in his 1846 astronomy student notebook where fanciful doodles filled the pages around his calculations related to the "transit of the moon and stars" for Georgetown and Greenwich observatories. These gifts in science and art were put to good purpose when Smith became a member of the 1849 U.S. Naval Astronomical Expedition to South America working as the "captain's clerk and serving as the expedition's artist." Later in life when Smith made his home in Skaneateles, New York, art remained central to him and found one outlet that related to religion when he donated a stained glass rose window which was placed over the front doors of his church, St. James Episcopal Church on the shore of Skaneateles Lake. This window's design revered *Deus* and the Holy Trinity of the *Pater*, *Filius*, and *Sp*^{tus} *Sanctus* in its central area and honored his family by displaying the initials of his father, mother, and sister in three outer circular areas. Although not of the Catholic faith, Smith drew on his education at a Jesuit college, an institution where science and art could join unaffected by one's religion, to gift something that illuminated his own family, faith, and church.[17]

Medical Ethics in North America: An Historical, Methodological, Bibliographical Study (New York: The Edwin Mellen Press, 1979), 110; Albert R. Jonsen, *The Birth of Bioethics* (New York: Oxford University Press, 1998), 36; and Robert B. Baker, et al. (eds.), *The Cambridge World History of Medical Ethics* (Cambridge: Cambridge University Press, 2009), 232.

[17] Smith's notebook held at GTUA, Observatory Collection, Box 1, Folder 20, student work. Overview about the U.S. Expedition, including Smith's appointment in Huffman, "The United States Naval Astronomical Expedition (1849-1852) for the Solar Parallax," , pg. 211. Additional details about Smith in my chapter 2. A history of the windows of this finger-lakes region church described in Kihm Winship, *The Windows of St. James, Skaneateles* (Collierville, Tenn.: Instantpublisher.com, 2014). Many thanks to Kihm for showing me St. James and the Smith house in Skaneateles when I made a research stopover on my way to the 2010 HSS conference in Montréal, Québec.

Cautious in Depth

While these examples of scope and purpose related to the teaching of science depicted American Catholic higher education in a mostly favorable light where productive expansion of curricula and pleasing personal fulfilments by those who studied or taught could be observed. In contrast, when it came to the depth of science being taught various boundaries appeared and solidified that put reconciliation of science and religion in a more cautious perspective. An unexpected limit in depth emerged from *The Notre Dame Scholastic* student publication when in 1896 it reviewed *Evolution and Dogma*, a recent book by the school's "distinguished Professor of Physics," the Rev. John A. Zahm. Heavy with forthright claims that the book "will necessarily be effective of much good" and "will show scientists the liberal views held by representative men in the Catholic Church, and it will open the eyes of certain Catholics whose good intentions exceed their learning," the reviewer, Austin O'Malley, professor of English Literature at Notre Dame, provided readers with an appraisal replete with deep insights and somewhat controversial comments that agreed with the book's goal of showing science and religion reconciled regarding evolution. "A mere amateur in science cannot but observe," O'Malley said plainly, "that Theistic Evolution is too well established at present to be slighted, and it will break no church windows." This review, likely vetted by school officials who saw no portent of the considerable controversy that would soon envelop Zahm and his book when it ran afoul of conservatives in Rome, shows a campus-level view of discussions taking place over evolution as framed by Catholicism as well as how a prominent educational institution like Notre Dame sanctioned an influential Catholic voice to write on these matters. As a place of learning "Notre Dame has always given special attention to the cultivation of the Physical and Natural Sciences," so declared the college's 1896 catalogue, but just one year after Zahm's book earned this favorable review in the school's periodical, Notre

Dame students would learn of the consequences of Zahm publishing his views on evolution when *Evolution and Dogma* would be denounced after catching the attention of the Congregation of the Index in Rome. The gravity of this exacting lesson on science and religion far exceeded anything they would have been encountered in the classroom as they would learn that reconciliation stood where Rome decreed.[18]

Beginning with the opening of Georgetown in the 1790s American Catholic colleges and universities acknowledged the need to fit within the unique social and political circumstances found in the fledgling nation and molded themselves in such a way that put a priority on teaching science to attract students. However, with Pope Leo XIII issuing multiple encyclicals containing guidelines as to the place of science in Catholic education, such as the earlier cited *Longinqua* in January 1895 which indicated "An education cannot be deemed complete which takes no notice of modern sciences," it remained a challenge for Zahm and others to discern the precise depth Rome would tolerate science to reach before conflicts arose over matters of Catholic religion authority. For the most part Rome accepted, and sometimes applauded, this approach. However, this successful strategy of accommodation suffered a reversal when Leo, who "had given frequent proof of his affection for the people as well as for the Church in the United States," made known in an 1899 Apostolic letter titled *Testem Benevolentiae Nostrae* to Cardinal James Gibbons, Archbishop of Baltimore, pointing out "certain things" that were "injurious to the peace," in effect setting an unambiguous boundary to which American Catholic higher education

[18] A. O'M, "Book Notice," *The Notre Dame Scholastic* 29:25 (1896), 401. I assume that theistic evolution did not break Protestant church windows like Smith's either. Details about Zahm's 1896 book and the issues arising out of its publication provided in a previous footnote. Notre Dame historian Phillip R. Sloan provides a good discussion about Zahm's interest in Theistic Evolution, see Phillip R. Sloan, "Bringing Evolution to Notre Dame: Father John Zahm, C.S.C. and Theistic Evolutionism," *The American Midland Naturalist* 161:2 (2009), 189-205. Description of Notre Dame's attention to science noted in *Annual Catalogue of the University of Notre Dame 1895-1896* (Notre Dame, Indiana: The University Press, 1896), 77. Details of Zahm's book being denounced found in Artigas, et al., *Negotiating Darwin: The Vatican Confronts Evolution, 1877-1902*. 143-144.

(and Catholics) must adhere to regarding their now firmly proscribed Americanist leanings. Religion, not science, held the higher place in the grander scheme of things and for American Catholic colleges and universities, science would be illumined as to its appropriate depth by the faith.[19]

Not all slights to the attempts by American Catholic higher education to offer science instruction came from high Catholic church officials or even from Catholics. Sometimes a shared interest in science came to naught between individuals of different faiths over unreconciled attitudes toward one another. In July 1846 Joseph Henry, then a professor of natural philosophy at Princeton soon to become Secretary of the new Smithsonian Institution, attended the public student examinations held at St. Mary's College in Baltimore. On its surface the event proved satisfying to Henry given that it was "conducted with considerable display" and he noted in particular a senior student who gave a talk about "electricity and magnetism [that] referred to my discoveries and mentioned me as having added to the science some valuable contributions." Henry, a Presbyterian, had remained incognito during the event on the earlier advice of a local Presbyterian pastor who "had informed me that if the Jesuits knew that I was present they would make capital of it by a publication in the papers." Henry's fear of endorsing Catholic education derived from his own views as well when he wrote in an 1844 letter to his

[19] See prior footnote about the *Longinqua*: Encyclical of Pope Leo XIII on *Catholicism in The United States*, dated January 6, 1895. Though not specific to Catholics and their schools, Roberts and Turner discuss the ascendency of science in the nineteenth century, see Roberts, et al., *The Sacred and the Secular University*, particularly chapter 3, 70-71. Pope Leo's 1899 letter, less on science and more on national customs, receives attention in Herbermann, et al. (eds.), *The Catholic Encyclopedia*,14:537-538. Also less about science, but helpful as to how American Catholic education went forward into the twentieth century, see Philip Gleason, "Baltimore III and Education," *U.S. Catholic Historian* 4:3/4 - Historians & Bishops in Dialogue: A Centenary Celebration of the Third Plenary Council of Baltimore 1884-1984 (1985), 273-313, along with Chapter 6, *The Catholics*, in James Tunstead Burtchaell, *The Dying of the Light: The Disengagement of College & Universities from their Christian Churches* (Grand Rapids, Michigan: William B. Eerdmans Publishing Company, 1998), 557-742. The siege from science from the Catholic point of view reviewed in Chapter 3, *A Church under Siege*, by O'Leary, *Roman Catholicism and Modern Science: A History*, 45-72, who writes on page 53: "Science had to be controlled."

brother "The catholic religion in its more offensive features cannot become popular in our country. It is incompatible with a system of diffused Education such as is now established in almost every part of the United States." His quiet snub laid bare how religious tensions left science and a nascent American scientific community in a diminished condition even though it was science that had first drawn Henry to this public event. Science served a deliberate purpose at these commencement proceedings where it showcased the earnest attention American Catholic higher education granted its instruction. By default, any public science on display stood reconciled with Catholicism in these arranged situations, but apparently Henry only saw its fount as being from a Catholic source, a source of which he disapproved to the detriment of all.[20]

Conclusion

Like my previous chapters evidence has been offered to demonstrate American Catholic colleges making a determined effort to provide instruction in science, except here the emphasis changed to show the various ways religion sometimes affected that instruction. Starting with Georgetown in the 1790s where the Rev. John Carroll worked to unite "the means of communicating science with an effectual provision for guarding and improving the morals of youth" to the Rev. Conaty in 1899 who declared that "College must put man in touch with science illumined by faith and with humanity ennobled and redeemed by Christ," science and religion stood actively conjoined as the American Catholic educational enterprise grew from a

[20] Details of Henry's attendance at the St. Mary's College exhibition appeared in a letter dated July 15, 1846, to his wife Harriet; from Marc Rothenberg (ed.), *The Papers of Joseph Henry*, Volume 6: January 1844 - December 1836; The Princeton Years (Washington, D.C.: Smithsonian Institution Press, 1992), 444-446. Henry's views of Catholics found in an 1844 letter to his brother James; ibid., 125-128. Details about Henry in Simon Newcomb, "Biographical Memoir," in *A Memorial of Joseph Henry* (Washington, D.C.: Government Printing Office, 1880), 441-473, and his Presbyterian Church burial in "The Obsequies," ibid., 11. He became the Smithsonian Secretary in December 1846. The AAAS did not take shape until 1848; see Chapter 19, *Liberty and Union: The American Association*, in Bruce, *The Launching of Modern American Science 1846-1876*. My thanks to Marc Rothenberg for telling me about this episode involved Henry and American Catholic education. The July 13 exhibition at St. Mary's College noticed in "From Baltimore and the North," *National Intelligencer*, July 14, 1846, 3.

single college to having opened nearly two hundred colleges and universities. Both could claim credit for the continuing success of this enterprise.[21]

Faith did indeed illumine the teaching of science in American Catholic higher education during the nineteenth century where, directly or indirectly, it stimulated the scope of taught curricula, expanded the purposes to which it served, yet generated caution as to the depth of science taught. Sometimes science stood ascendent as when many Catholic colleges gave it curricular emphasis with courses culminating in the Bachelor of Science degree; other times religion retained control when discussions on science topics went outside of acceptable doctrinal bounds. Yet most times science and religion remained quietly reconciled in classroom textbooks, at academic events, and for students such as Seddie Bingham for whom Catholic higher education clearly served.[22]

Yet by 1900 the boundary between the domains of science and Catholicism remained still coarsely defined with some lines recently drawn via Papal edicts and others determined by the many rapid changes in the sciences (i.e., biology) and technology (i.e., engineering). Catholic educators, still chastened by the 1899 *Testem Benevolentiae Nostrae* letter, displayed caution when talking about the place of science in Catholic higher education. The Rev. Henry J. DeLaak, S.J. a physics professor at St. Louis University, stated in 1901 "it is hardly the question whether science is to be excluded from a college course or not; but rather its limits in the course" and went on to clarify these limits saying, "science may crowd e.g. the humanities somewhat, but

[21] Rather than science in service of religion, Deborah Warner talks about how science "served to advance the social and cultural values of the nation" in Deborah Warner, "Physics as a Moral Discipline: Undergraduate Laboratories in the Late Nineteenth Century," *Rittenhouse* 6:4 (1992), 116-128, pg. 128.

[22] This conclusion stands in contrast to Julie Reuben's claim about the marginalization of morality in late nineteenth-century American institutions (a book that references no Catholic institutions I should note). For Catholic schools to this day, morality continues to animate discussion while "modern" Catholic schools teach advanced scientific topics, see Julie A Reuben, *The Making of the Modern University* (Chicago: University of Chicago Press, 1996).

not necessarily to an extent which would sacrifice them." In DeLaak's view a "complete education" required both the sciences and the humanities, but where to situate a balance point between them was something which would remain a persistent and oft times contentious issue for decades to come. To critics of Catholicism this situation appeared like warfare, but for most Catholics science was not the enemy of religion, instead science simply had its own sphere apart from Catholic theology and reconciling served as a bridge between them, not a wall.[23]

[23] Text of DeLaak's talk found in *Report of the Third Annual Conference of the Association of Catholic Colleges of the United States* (Washington, D.C.: Catholic University Press, 1901), 43-70, quotations from pgs. 44 and 68. The simplistic warfare model regarding Roman Catholics dismantled nicely by Mislin, "Roman Catholics," , 103-122. Jesuit astronomer Johann Georg Hagen wrote a lengthy entry for the Catholic encyclopedia titled "Science and the Church" which ca. 1912 laid out in great detail the boundaries and proper relationship between science and Catholicism; see Herbermann, et al. (eds.), *The Catholic Encyclopedia*, 13:598-609. Also, Hagen is discussed in the following chapter.

Map 6 – Locations of institutions mentioned in *Finding* chapter

Chapter 5: Finding

We know but little as to the kind of education,
methods of work and mode of life, which are
most favorable to scientific productivity.

J. McKeen Cattell, "A Further Statistical Study of American Men of Science," *Science* (1910)[1]

In 1906 James McKeen Cattell published *American Men of Science: A Biographical Directory* as "a contribution to the organization of science in America" meant to serve as a reference "to make men of science acquainted with one another and with one another's work." Subsidized in part by the Carnegie Institution, the volume listed over 4000 names assembled from the membership lists of assorted national societies, an undertaking no doubt helped by Cattell's numerous connections as editor of the journal *Science* and *The Popular Science Monthly* magazine. Above and beyond granting each person a brief biography, Cattell chose 1000 individuals whose work "is supposed to be the most important" in twelve principal scientific fields and affixed a 'star' to that person's department as a further aid to potential collaborations. Cattell's volume garnered modest notice from the press where one commentator likened it a Baedeker travel guide for using an asterisk to identify "the thousand who have made contributions of real importance to science," a remark that overlooked Cattell's openly stated objective to undertake a statistical study about "the conditions, performance, traits, etc., of a large group of men of science." While Cattell's directory enjoyed ongoing success as a practical reference being in its sixth edition at the time of his death in 1944, its functioned less as a tourist

[1] J. McKeen Cattell, "A Further Statistical Study of American Men of Science," *Science* 32:827 (1910), 633-648, 672-688, 634.

guide to American scientists and more as a continual source of raw data Cattell put to use in generating a succession of "highly important" studies about the growing population of American scientists, studies based on his system of starred individuals which itself received acknowledgment as "a major contribution to the growth of research in America." Thus, the American scientific enterprise - its scientists and their organization - along with science itself became collective objects of formal study.[2]

Like Cattell, I want to exploit *American Men of Science* as a data source to pose questions about American men and women of science. Specifically, my goal is to mine this pioneering directory for evidence that illuminates a century's worth of efforts by American Catholic higher education to educate individuals in the sciences. In other words, I want to locate those persons who, based on their educational affiliation, institutional home, ecclesiastical status, or other directory details, can be classified as most likely being Catholic above and beyond being notable scientists. I will employ the term 'Cattell's Catholics' to reference these individuals, a subset of his directory that can offer an historical lens to improve our knowledge of the American Catholic higher education enterprise and its place within the larger confines of American science. This plan aligns with the questions Cattell raised in 1910 when he noted that "we know but little as to the kind of education, methods of work and mode of life, which are

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[2] J. McKeen Cattell (ed.), *American Men of Science: A Biographical Directory* (New York: The Science Press, 1906), preface, vi-vii. The twelve principal fields with the number allotted each one in parenthesis are as follows: chemistry (175), physics (150), zoology (150), botany (100), geology (100), mathematics (80), pathology (60), astronomy (50), psychology (50), physiology (40), anatomy (25), and anthropology (20). Baedeker similarity noted in "Literary Notes," *The Independent* 60:2992 (1906), 809 ; more reviews in "Notes," *The Nation* 82:2126 (1906), 260; and "Who's Who in Science," *New York Times*, March 10, 1906, 153; and Cattell (ed.), *American Men of Science: A Biographical Directory*, preface, vii. Cattell's work noted as "practical" and "highly important" in W.B. Pillsbury, "Biographical Memoir of James McKeen Cattell, 1860-1944," *National Academy Biographical Memoirs* XXV (1947), 5; Cattell's 'star system' praised in Stephen S. Visher, "Distribution of the Psychologists Starred in the Six Editions of 'American Men of Science'," *The American Journal of Psychology* 52:2 (1939), 278-292, pg. 278, footnote 1. Clark A. Elliott, "Models of the American Scientist: A Look at Collective Biography," *Isis* 73:1 (1982), 77-93.

most favorable to scientific productivity," to which he wanted "to apply scientific methods to determine the circumstances that promote or hinder the advancement of science." Cattell had his turn starting in 1910 and now it is my turn to consider these Cattell's Catholics by analyzing their biographical data to extract details and insights about their unique circumstances related to Catholic higher education within the greater sphere of American science.[3]

To preview my discussion, I have identified sixty-nine men and one woman of science from the 1910 second edition of Cattell's directory who match my selection criteria, a list of names that I will use to better understand the American Catholic higher education enterprise. As products of or contributors to this enterprise, these seventy Cattell's Catholics afford me a critical gauge for judging the range and effectiveness of this under-studied enterprise from the late nineteenth and early twentieth centuries. Furthermore, they also point out scientific fields of study, teaching, or research appropriate, if not auspicious, for Catholics. Thus, by pondering these seventy Cattell's Catholics, I can not only deepen our understanding about Catholic higher education with respect to science, I expose the ways in which Catholic scientists found a place in Cattell's "organization of science in America." At the same time, I also disclose their small numbers, that despite their laudable efforts, these individuals remained a handful among thousands. Here American Catholic higher education could be viewed as waning and in a backwater of sorts, a disappointing state of affairs after having made strong advancements over much of the nineteenth century. Both sides of this Catholic "kind of education" need to be brought to light.[4]

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[3] Cattell, "A Further Statistical Study of American Men of Science," 634.

[4] Cattell (ed.), *American Men of Science: A Biographical Directory*, preface, v. Greeley, *From Backwater to Mainstream: A Profile of Catholic Higher Education*. Cattell, "A Further Statistical Study of American Men of Science," 634.

My approach to this analysis will comprise a brief introduction of Cattell, basic details about the 1910 edition of *American Men of Science* being used as the key source for my data, and my data abstraction methodology. At that point, I can begin analysis in full earnest. So, thanks to Cattell and his investigations into the condition of American science and scientists, I have a rich source of data that reveals the shape and contributions of American Catholic higher education vis-à-vis science.

James McKeen Cattell

Born in Easton, Pennsylvania, James McKeen Cattell (1860-1944) was the first of two sons of William and Lizzie Cattell. James would attend Lafayette College, a small Presbyterian school in Easton where his father was president, from which he earned an A.B. degree in 1880. Cattell spent the next several years undertaking further studies, oscillating between various universities in Europe and Johns Hopkins University in United States before receiving a Ph.D. in 1886 from Leipzig University in experimental psychology. His transatlantic movements continued for two more years as he held teaching positions at the University of Pennsylvania, Bryn Mawr College, and the University of Cambridge before settling in the States to become chair of the psychology department at the University of Pennsylvania. One more decisive move in 1891 brought him to Columbia University in New York City to chair their psychology department where he fostered an eminent doctoral program in that field.[5]

From this New York City location, Cattell vastly expanded his engagement with the sciences and scientists of his day when he became the editor of the journal *Science* in 1895. Its editorial board included many well-known American scientists such as Simon Newcomb, C. Hart

[5] Biographical details about Cattell found in Michael M Sokal, "*Science* and James McKeen Cattell, 1894 to 1945," *Science* 209 (1980), 43-52, Pillsbury, "Biographical Memoir of James McKeen Cattell, 1860-1944," and vol. 1 of James McKeen Cattell, et al., *James McKeen Cattell, 1860-1944; Man of Science* (Lancaster, PA.: Science Press, 1947).

Merriam, Thomas C. Mendenhall, John Wesley Powell, and John Shaw Billings, and Cattell's work with them gave him broad contact with even more American men and women of science. In 1900 after several years of negotiations, Cattell reached an agreement with the AAAS, or the American Association for the Advancement of Science, to make *Science* the official publication for its members, which expanded Cattell's profile among that group's membership. Cattell became further ensconced in American science by way of his 1901 election as a member of the National Academy of Sciences which provided him with yet another prestigious platform for his many undertakings. It would be at this time and in these circumstances that Cattell began to scientifically research and prepare what he called "an investigation of the scientific men of the United States." Appearing shortly after the 1906 *American Men of Science* directory came out was Cattell's article in *Science* titled "A Statistical Study of American Men of Science" which he termed "only a beginning of a study of scientific men as a group and of the conditions on which scientific performance depends." It was Cattell's keen interest in this topic over many years that now provides the raw data which will serve my need for an inventory of who was scientifically active in America around the turn of the century. Thus, my plan is to search Cattell's 1910 second edition of *American Men of Science*, a directory now expanded to list over 5500 names, to find those I classify as Cattell's Catholics.[6]

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[6] Sokal, "*Science* and James McKeen Cattell, 1894 to 1945," 43.See Robin Vandome, "The Advancement of "Science": James McKeen Cattell and the Networks of Prestige and Authority, 1894–1915," *American Periodicals* 23:2 (2013), 172-187, and the opening article "The American Association for the Advancement of Science," *Science* 13:338 (1901), 961-969. Cattell became one of 87 member as of 1902; see *Report of the National Academy of Sciences for the year 1901* (Washington, D.C.: Government Printing Office, 1902). J. McKeen Cattell, "A Statistical Study of American Men of Science: The selection of a group of one thousand scientific men," *Science* 24:621 (1906), 658-665; 699-707; 732-742.

American Men of Science, 1910 edition

The 1910 edition of *American Men of Science* (or AMOS) needed 528 pages to list the names and biographical details regarding the 5500 scientific men and women who had responded to Cattell's constant requests for information. Meteorologist Cleveland Abbe appeared first and physiologist William Douwes Zoethout came in last in this revised directory Cattell and his cadre of assistants spent years preparing. The volume's preface recounted the effort demanded "to make the book as complete and accurate as possible" as "nearly a third of the names in the present edition are new, and the sketches which appeared in the first edition have in nearly every case been revised." In addition, Cattell maintained his scheme of affixing an asterisk next to the scientific field(s) of each newly selected one thousand leading men and women of science. Taken as a whole, I will have ample data to support my search for potential Cattell's Catholics.[7]

Every scientist appearing in AMOS not only found their name, current address, place and date of birth, honors and awards, and learned society memberships listed, but also their scientific field(s) of research, educational details including degrees, and main institutional positions or affiliations, information that was central to Cattell's ambition of making "men of science acquainted with one another and with one another's work." By listing more names than the 1906 first edition (5500 versus 4000), with errors corrected and oversights rectified, and in being able to look back over the American scientific and educational landscape from the plateau of 1910, this second edition of AMOS better characterizes American scientists as well as American

[7] J. McKeen Cattell (ed.), *American Men of Science: A Biographical Directory* (New York: The Science Press, 1910), preface to the Second Edition dated October 1910, viii. The practice of "starring" individuals ceased with the 1949 8th edition.

science, hence making it viable for me to extract a reliable picture of my desired group, namely Cattell's Catholics.[8]

Finding Cattell's Catholics

Since Cattell's directory lacks explicit information regarding an individual's religious affiliation, I resorted to gleaning this datum from what the directory did offer by scanning every entry on all 530 pages of text for specific keywords indicative of a connection with Catholic higher education. In many cases, a keyword such as 'Georgetown' or 'Creighton' flagged a person as a graduate or employee of that particular Catholic educational institution. Ecclesiastical status, such as 'Rev.' and 'S.J' proved helpful in locating or confirming some individuals being a Cattell's Catholic. Other less specific keywords, such as 'St.' and similar abbreviations, pointed to more directory entries, but required care to verify some sort of Catholic affinity existed. This scanning was performed using a digitized copy of the 1910 AMOS book and by manually looking at each and every entry in my personal copy to ferret out uncommon institutions, places, and titles that might signpost someone as being a Cattell's Catholic. Compared to the herculean effort that would be required to research each person listed in AMOS to ascertain a person's religious faith, my keyword-based abstraction methodology offers a certain efficiency without forgoing reasonable accuracy. As I previewed in my introduction, my search located 70 Cattell's Catholics, sixty-nine men and one woman (listed in Table 1), who will be given over to analysis to answer my questions about American Catholic higher education and address, in part, Cattell's larger question "as to the kind of education" that is "most favorable to scientific productivity."[9]

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[8] Cattell (ed.), *American Men of Science: A Biographical Directory*, preface, v.

[9] Cattell, "A Further Statistical Study of American Men of Science," 634. No attempt was made to reconcile my list of Cattell's Catholics against the 1911 *American Catholic Who's Who* which listed Catholics (and apparently a few

Before putting these Cattell's Catholics under a microscope, some qualities about this group need to be discussed. One, they are a contrived category of my own making and not a self-identifying unit of Catholic scientists active when Cattell's directory appeared. Two, nationalities are ignored given that if Cattell included someone in his *American* Men of Science directory, that is sufficient for me to characterize that person as connected to *American* Catholic higher education. Three, no doubt my keyword search strategy overlooked many likely Catholics from Cattell's directory due to a lack of keywords identifying them as Catholic. I made no attempt to remedy this situation by manually including any well-known Catholics. Four, I claim Cattell overlooked some who could have been included but were not for some reason. As examples, Frederick L. Odenbach, a Jesuit at St. Ignatius College in Cleveland who engaged with meteorology and seismology, and Charles Marie Charroppin, a Jesuit at St. Louis University who studied solar eclipses, were not named in Cattell's directory. Last, any Catholics listed in this directory who attended a secular institution for their education will remain undetected. While a pragmatic choice from the student's point of view in obtaining the best possible training in science, Catholic educational circles looked on this practice with no little concern in respect to their underachieving colleges and universities when it came to teaching the sciences. Overall, my inventory of Cattell's Catholics may not be perfect, probably too low in

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non-Catholics) of all stripes, not just those connected in some with American science. This analysis would be a big project all to itself; see Georgina Pell Curtis (ed.), *The American Catholic Who's Who* (St. Louis: B. Herder, 1911). Robert Bruce analyzed a group of nineteenth-century American scientist using the DAB (or *Dictionary of American Biography*) as his data source which "seldom specified religious affiliation," so he left this category of study aside, a choice I declined to make with Cattell's AMOS; see Robert V. Bruce, "A Statistical Profile of American Scientists, 1846-1876," in George H. Daniels (ed.), *Nineteenth-Century American Science* (Evanston: Northwestern University Press, 1972).

number, certainly not too high, but still appropriate in working to address my exploration into the teaching of science by the American Catholic higher educational enterprise.[10]

I have partitioned this interrogation into four units, each intended to frame the data from Cattell's directory in a particular way. The first works to expose what role the Cattell's Catholic stars had in the development of American Catholic higher education. The second puts a spotlight on how a Catholic Sister found her way to a Ph.D. and where Catholic higher education stood when it came to educating women. A third framing looks at Cattell's Catholic Physicians who represented the majority of my Cattell's Catholics while simultaneously showing the least affinity to Catholicism. My last framing considers those Cattell's Catholics awarded an honorary degree from a Catholic institution and what this tells us about education, science, and religion. Like Cattell who wanted to better understand American science through a study of its scientists and their various traits, my disaggregation of 70 Cattell's Catholics into groups should likewise aid my own analysis.

Cattell's Catholic Stars

Of the seventy Cattell's Catholics under study, nineteen received 'stars' from Cattell as scientists "whose work is supposed to be the most important" (see the '*' entries in Table 1). These Catholic 'stars' attained high status for scientific work across a broad range of fields including astronomy, medicine, physics, botany, psychology, entomology, chemistry, anatomy,

[10] About Odenbach, who would not be listed in Cattell's 1921 third edition of *American Men of Science*, see James Bernard Macelwane, S.J., *Jesuit Seismological Association 1925-1950: Twenty-Fifth Anniversary Commemorative Volume* (St. Louis: Saint Louis University, 1950), 3-9, along with Carl-Henry Geschwind, "Embracing Science and Research: Early Twentieth-Century Jesuits and Seismology in the United States," *Isis* 89 (1998), 27-49. A brief overview on Charroppin found in Nancy Merz, "C.M.C.: Astronomer, Photographer, Missionary, Character," *Jesuit Bulletin: The Missouri Province* 66 (1987), 8-13. "Statistics of Attendance of Catholic College Students at Non-Catholic Colleges and Universities, and the Causes Thereof," *Catholic Educational Association: Report of the Proceedings and Addresses of the First Annual Meeting, St. Louis, MO. July 12, 13 and 14, 1904* (Columbus, Ohio: Published by the Association, 1904), 78-82. Useful to thinking about my analysis was Lewis Pyenson, "'Who the Guys Were": Prosopography in the History of Science," *History of Science* 15 (1977), 155-188.

mathematics, mechanics, etc., and collectively did well with a 27% star award rate (19 out of 70) compared with the 1910 directory's overall rate of 22% with 1201 stars from 5500 biographical entries. I will explore this result as it meshed with the Catholic higher education enterprise through three exemplar scientists - a chemist, a psychologist, and an astronomer - to understand how Catholic education related to their 'star' in Cattell's 1910 directory and what that 'star' might have contributed to Catholic higher education.[11]

An A.B. degree conferred in 1867 from Mt. St. Mary's College started Thomas M. Chatard down the road towards a career in chemistry by providing him with a foundational liberal arts education that included study of the natural sciences. Mt. St. Mary's College, a well-established Catholic institution in Maryland, taught chemistry during a student's second year of study where they had access to the school's "Chemical Laboratory." Chatard was taught chemistry by the Rev. Leonard Obermeyer, a priest known for his "profound and exact learning" and being "orderly as a clock" after putting the school's teaching apparatus "in excellent form." Yet Mt. St. Mary's appeared lacking when it came to imparting knowledge about chemistry as Chatard then went on to attend a non-Catholic college for additional chemistry instruction, this being Harvard University where he would earn a B.S. degree in 1871. Given his publications, such as a contribution to *The Chemical News* in October 1871, Chatard evidently found Harvard to his liking where he graduated *magna cum laude*.[12]

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[11] Cattell (ed.), *American Men of Science: A Biographical Directory*, preface, vi. For his 1910 directory Cattell "again selected" the "thousand leading men of science" to receive stars, names that would entail obvious overlap with the 1000 stars he assigned in the 1906 edition of his directory. He explained this outcome in his preface that "269 new men . . . have obtained places on the list" while mentioning later in the directory that "68 who died or were removed," giving a total of 1201 (1000 + 269 – 68 = 1201). See preface and page 568 in Cattell (ed.), *American Men of Science: A Biographical Directory*, respectively.

[12] Chatard graduated June 28, 1867, see "Commencement of Mount St. Mary's College - The Exercises, Speeches, etc.," *The Sun*, July 2, 1867, 4. Well before Chatard enrolled at Mt. St. Mary's, attention to teaching natural philosophy and chemistry during the student's second year, helped by "an excellent philosophical apparatus" and "a Chemical Laboratory," was found in the college's 1857 catalogue; see *Catalogue of the Officers and Students of*

A Ph.D. from the University of Heidelberg in 1876 completed Chatard's education and provided an essential credential on the pathway to a Cattell's 'star' for chemistry. For Chatard, his interest in analytical chemistry compelled him to attend better equipped non-Catholic institutions that had the expensive apparatus needed for studying contemporary laboratory-based sciences, something Mt. St. Mary's or other Catholic colleges at the time simply did not enjoy. Thus, his progression from a Catholic institution for initial training and then attending two non-Catholic institutions for advanced chemistry studies betrays the limited means of Catholic institutions of the time to teach science at a high level desired by Catholic students.

American Catholics hoped to address this shortcoming when the Catholic University of America opened in 1889 which aimed to embody "the union of the highest sacred learning with the fullest natural science" with instruction taking place entirely at the graduate level. Initially focused on theological studies through its school of divinity, the university added a school of philosophy in 1895 with future Cattell Catholic 'star' the Rev. Edward A. Pace as its dean where science would get full attention. Also serving as a professor in the school's psychology department, Pace started out down an educational pathway like Chatard by earning an A.B. degree from a Catholic college, St. Charles College in Maryland, but then unlike Chatard pursued ordination and a Doctor of Divinity degree at the Pontificio Collegio Urbano de Propaganda Fide in Rome. Although these academic credentials were sufficient to gain him an offer to teach at Catholic University, he still needed an advanced degree in his field of interest, experimental

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Mount St. Mary's College, Emmitsburg, Md., for the academic year 1856-1857 (New York: D&J Sadlier & Co., 1857), 5, 7. The Rev. Obermeyer remembered in Thomas J. Stanton, *A Century of Growth: The History of the Church in Western Maryland* (Baltimore: John Murphy Company, 1900), 1:22, and Meline, et al., *The Story of the Mountain: Mount St. Mary's College and Seminary, Emmitsburg, Maryland*, 2:31. He listed as the college's "Prof. of Chemistry & Nat. Philosophy" in *Metropolitan Catholic Almanac and Laity's Directory 1861* (Baltimore: John Murphy & Co., 1860), 286. Thomas M. Chatard, "On the Determination of Molybdic Acid as Plumbic Molydbdate," *The Chemical News* XXIV: 620 (1871), 175-176. Chatard earned one of three B.S. degrees awarded in 1871, see "Harvard College: Commencement Day," *Boston Daily Advertiser*, June 29, 1871, 1.

psychology, and for this, like Chatard, Pace completed a Ph.D. from a non-Catholic European university, Leipzig University, not surprisingly under Wilhelm Wundt who was the same professor Cattell studied with in the 1880s. In contrast to Chatard, who pursued his career outside of Catholic education, Pace believed in the mission of Catholic University to offer higher education to Catholics where he remained until his retirement in 1935. Notably he produced at least one Cattell's Catholic, Thomas Verner Moore, who earned a Ph.D. in experimental psychology under Pace in 1903 and would find himself listed in Cattell's 1921 AMOS directory, although not as a 'star'. It was a small first step for Catholic University to produce a recognized 'man of science' in Moore as Catholic higher education showed a profit from one of its own few stars, especially in a relatively new field that many influential Catholics found "incompatible with their religious beliefs."[13]

If there was a field of science safely synonymous with Catholicism, it would be astronomy where members of the Jesuit order had repeatedly accrued particular acclaim. Johann Georg Hagen, S.J., an Austrian-born Jesuit who immigrated to America in 1880, followed in this mold where he first taught mathematics and astronomy at the newly established College of the Sacred Heart in Prairie du Chien, Wisconsin, until 1888 when he took over as director of the observatory at Georgetown College in Washington, D.C. In 1910 Cattell would confer a 'star' on Hagen for his knowledge of mathematics with astronomy co-listed as his second field of

[13] Words spoken at a formal dinner following the opening of the university, see *Solemnities of the dedication and opening of the Catholic University of America, November 13th, 1889*, 33. About the founding history of Catholic University, see Nuesse, *The Catholic University of America: A Centennial History*, chapters 1-4. An appreciative overview about Pace with these educational details published in "Eastern Division - Reports," *Proceedings and Addresses of the American Philosophical Association* 12 (1938), 193. J. McKeen Cattell, et al. (eds.), *American Men of Science: A Biographical Directory* (Garrison, New York: The Science Press, 1921), 487. Regarding experimental psychology at Catholic University, Pace and Moore both receive good attention in Bruce M. Ross, "Development of Psychology at The Catholic University of America," *Journal of the Washington Academy of Sciences* 82:3 (1992), 133-159. See Ross, "Development of Psychology at The Catholic University of America," 134-141; quotation on pg. 134.

expertise, but it would be his work in this latter field on variable stars while at Georgetown that Hagen fashioned a place in American science. Aided by two Jesuit assistants, George A. Fargis and John T. Hedrick, Hagen pursued a program of research that brought him and Georgetown to the attention to community of American astronomers and positioned him by 1897 to become a founding member of the Astronomical and Astrophysical Society of America. In contrast to his predecessor, James Curley, S.J., who gave teaching and "the instruction of students and others in the use of fine astronomical instruments" a high priority, Hagen pursued a determined agenda of astronomy research and publication.[14]

While "Father Hagen has been very successful in his astronomical work and has become widely known on account of his researches," wrote a local newspaper in 1897, this reputation came at a cost regarding his having time available for teaching or lecturing. When neighboring Catholic University inquired in 1891 about Hagen lecturing at their campus, this request was denied with it being "impossible in the present condition of his work" in a letter penned not by the otherwise engaged Hagen, but by the Georgetown president Joseph H. Richards, S.J., directly to Catholic's rector the Rt. Rev. (and Bishop) John Keanes. Moreover, Hagen later confirmed giving priority to research over teaching when he added his name to a resolution passed unanimously by 24 leading American astronomers meeting at the 1897 Astronomical and

[14] Good overviews of Hagen's life and career appear from two sources, one scientific and one religion, first see J. Stein, "Johann Georg Hagen, S.J.," *Popular Astronomy* 39 (1931), 8-14, 8-14, then "Obituary - Father John Hagen, S.J.," *Woodstock Letters* 40 (1931), 282-290, 282-290. An expansive history of the Georgetown Observatory given chapter 14 of Easby-Smith, *Georgetown University in the District of Columbia 1789-1907: Its Founders, Benefactors, Officers, Instructors and Alumni* , 1:282-292, with attention to Hagen found on pgs. 287-292. Fargis and Hedrick both listed as an "assistant astronomer" versus Hagen's title of "Director of the Astronomical Observatory," see *A Catalogue of the Officers and Students of Georgetown University, one hundred and fifth year, 1892-'93* (Washington, D.C.: Stormont & Jackson, 1893), 9. Hagen was one of 113 members of the new society at its 1897 meeting and conference held at the dedication of Yerkes Observatory, see *Publications of the Astronomical and Astrophysical Society of America, Vol. 1, Organization, Membership, and Abstracts of Papers 1897-1909* (Ann Arbor: Ann Arbor Press, 1910), x. Curley's teaching aspirations for the observatory he founded in 1843 mentioned in Curley, *Annals of the Astronomical Observatory, Georgetown College, D.C., No. 1*, preface.

Astrophysical Society of America conference held at Yerkes Observatory, requesting that "the practical astronomer in charge of an observatory . . . should not be required to teach classes oftener than five hours per week." While Hagen's priority for research led to what Cattell would deem as favorable scientific productivity, productivity that influenced Hagen's selection in 1906 as the director at the Vatican Observatory in Rome, only modest benefits accrued to Georgetown, its students, or, more critically, Catholic higher education overall. Benefits did flow to Hagen's two assistants as the Rev. Fargis would be listed in Cattell's directory for chemistry and astronomy and the Rev. Hedrick would replace Hagen as director of the college's observatory. Distracted by the stars, Hagen's disinterest in education exposes one underlying reason for the dearth of Cattell's Catholics.[15]

From my discussions about three Cattell's Catholic 'stars' (Chatard, Pace, and Hagen), I identified some shortcomings and strengths regarding American Catholic higher education when it came to science. One failing involved the lack of graduate-level science education comparable with non-Catholic institutions, a situation that forced Catholics like Chatard and Pace to seek their Ph.D.s overseas. A partial solution to this problem appeared with the opening of Catholic University as a graduate-level only institution where Pace would virtuously dedicate himself as a professor for nearly four decades and produce at least one doctorate in science who then went on to become a Cattell's Catholic. Had Father Hagen at Georgetown been more willing to teach astronomy as intensely as he pursued research, Georgetown's observatory could also have become a welcomed site of advanced astronomy for Catholic higher education. Instead, just his

[15] "Wealth Aiding Science: Father Hagen's Chart of Variable Stars to be published," *The Evening TIme*, November 12, 1897, 8. Letter from Richards to Keane dated January 20, 1891. Catholic University of America archives, Keane Collection, Office of the Rector, File 2/76, Box 2. George E. Hale, "Astronomical Research and Teaching," *Science* 7:172 (1898), 532-534, 532-534, 533. About Hagen's being called to Rome by Pope Pius X for this position noted in John T. Hedrick, S.J., "Father John G. Hagen, S.J.," *Georgetown College Journal* 34:8 (1906), 380-381.

Jesuit assistant rather than any Georgetown students secured an entry in Cattell's directory, a lamentable outcome only compounded when Hagen then abdicated Georgetown for the Vatican observatory.[16]

By the time of Cattell's 1910 directory, it was clear that American Catholic higher education had not yet reached institutional or professorial critical mass when it came to teaching science. Furthermore, what science work these Cattell's Catholic stars undertook stood firmly in the realm of Kuhnian "normal science" that left any pushing or breaking of paradigms to others. While Catholic University exemplified a promising response to this 'Catholic' problem where Pace and four other Cattell's Catholics 'stars' graduated only a trickle of Ph.D.s, a humbling number that confirms what Knapp and Goodrich reported about the low productivity of Catholic institutions. As regards Georgetown, only its medical school stood out as a producer of graduates with higher degrees (to be discussed below), not its astronomy or other more traditional science departments even with the presence of a 'star' like Hagen. Given too few Cattell Catholic 'stars' and the few who did exist were not connected to teaching, this overall outcome generates little surprise. Yet, a Ph.D. from Catholic University or an M.D. from Georgetown wasn't the only way to secure an entry in Cattell's directory as we see next.[17]

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[16] Pace's devotion to Catholic University stands in stark contrast to Chatard who sometimes lectured at Columbian University in D.C. during the 1900s; see *The Columbian University, Washington, D.C., Announcements 1903-'04* (Washington, D.C.: Judd & Detweiler, 1904), 14, where he was listed as a "Lecturer in Chemical Engineering."

[17] As seen in Table 1, the other Catholic University teaching 'stars' besides Pace included Cameron, Greene, Shea, and Zahm. Beside Moore's Ph.D. in 1903, Catholic University produced four other doctorates in science prior to 1910: Herman Theodor Holm, Julius Nieuwland, Nicholas Wilhemy, and Thomas McKeown in 1902, 1904, 1905, and 1907, respectively. See *Doctoral Dissertations published by the students of Catholic University of America*, 15. Greene and Holm noted at length in my *Responding* chapter. Normal science defined in Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962), 10.

Catholic Sister Science

Attesting to the growing number of women in American science, Sister Helen Angela (Dorety) found herself listed in Cattell's directory within a year of completing her Ph.D. in botany at the University of Chicago under the supervision of Prof. John M. Coulter, a Cattell starred botanist himself. Sister Helen received her doctorate in 1909 after publishing three articles on cycads and then returned directly to her home institution, the College of Saint Elizabeth in New Jersey, to resume teaching botany and other sciences to young women. As the lone female among my Cattell's Catholics gleaned from the 204 women listed in the 1910 AMOS, Sister Helen's entry draws needed attention to the changing attitudes and available educational pathways associated with advanced study for female Catholics.[18]

Considered "gifted" by her advisor, Sister Helen's research in botany situated her in a field with many other women, including three who earned stars in botany in the 1910 AMOS edition, as it and natural history in general had long remained a traditional topic in female education since the early 1800s. While Cattell averred an optimistic attitude about the status of women in science when he wrote that "future women may be able to do their share for the advancement of science," Sister Helen would have two hurdles to surmount before she would be

[18] Sister Helen and her publications listed in *A Record of the Doctors in Botany of the University of Chicago 1897-1916, presented to John Merle Coulter, professor and head of the Department of botany, by the doctors in Botany at the quarter-centennial of the university, June 1916* (Chicago: University of Chicago, 1916), 39. The University of Chicago botany program appeared friendly to female graduate students as roughly 30% of the 82 doctorates listed in this commemorative volume were awarded to women. Coulter's entry in the 1910 AMOS appeared on page 101. Run by the Sisters of Charity, a Catholic order of women founded by Elizabeth Ann Seton in 1809, the College of Saint Elizabeth would open in 1899 for collegiate instruction and Sister Helen would be among its first graduates by receiving a B.A. degree in 1903. For more information about the college, consult Sister Mary Ellen Gleason, et al., *College of Saint Elizabeth* (Charleston, SC: Arcadia Publishing, 2000), and Sister Blanche Marie McEniry, *Three Score and Ten: a history of the College of Saint Elizabeth, 1889-1969* (Convent Station, N.J.: College of Saint Elizabeth, 1969). About Sister Helen, see her entry in Joan N. Burstyn (ed.), *Past and Promise: Lives of New Jersey Women* (Syracuse, N.Y.: Syracuse University Press, 1997), 271-272. Helpful statistics regarding the first three editions of Cattell's *American Men of Science* provided in Margaret W. Rossiter, "Women Scientists in America before 1920," *American Scientist* 62:3 (1974), 312-323, 312 and 315.

in a position to exemplify Cattell's optimism. One obstacle entailed the administrators running female Catholic colleges to concede that their schools were not up to the task of teaching students contemporary science, mainly because most of their faculties of religious sisters like Sister Helen, who were no doubt dedicated, were not up to date within their various scientific fields, that teachers with advanced degrees were needed. The other challenge involved admitting that, at the dawn of the twentieth century, no American Catholic institutions were offering advanced degrees which would accept females. Effectively, there existed no in-house solution that could rectify this dilemma. Hence, any remedy involving advanced education portended that Sister Helen and others like her would need to attend a non-Catholic, conceivably secular, institution.[19]

For Sister Helen, timing worked well in her favor for going down this exact path. Having taught high school after entering her order in 1890, she began formal collegiate education in 1900 at the College of Saint Elizabeth in New Jersey just as it and a handful of other Catholic female schools received official permission from their superiors, along with charters from state officials, to offer curricula culminating in a Bachelor degree. Earning her B.A. in 1904, Sister

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[19] Burstyn (ed.), *Past and Promise: Lives of New Jersey Women*, 271. Out of the 204 women listed in the 1910 AMOS, 25 or 12.3% received one of Cattell's stars, including three listed for botany: Elizabeth Gertrude Britton (57), Alice Eastwood (134), and Dr. Margaret Clay Ferguson (149). For men they received stars at a higher percentage, 18.4%, based on their numbers in the directory. Visher offers a useful list of all women starred from 1903-1943, see Stephen Sargent Visher, *Scientists Starred 1903-1943, in "American men of science"; a study of collegiate and doctoral training, birthplace, distribution, backgrounds, and developmental influences* (Baltimore: Johns Hopkins Press, 1947), 148-149. In regard to natural history as a main subject of female instruction, see Tolley, *The Science Education of American Girls: A Historical Perspective*, especially chapters 5 and 6. Cattell, "A Further Statistical Study of American Men of Science," 676. Yet Cattell was quick to assign blame to "the school and the employment of female teachers" for weakening the family, society, and the human race, a view evident in J. McKeen Cattell, "The School and The Family," *Popular Science Monthly* 74 (1909), 84-95, 92. This contradictory temperament receives attention in Ginger Hudson, et al., "The impact of the Variability Hypothesis on Margaret F. Washburn's and Mary W. Calkins' parodoxical relations with faculty in their graduate programs," *Modern Psychological Studies* 11:1 (2005), 1-9. Catholic University of America in Washington, D.C., was the only research university in operation around 1900 and it did not accept women to their graduate school until 1928; from Margaret W. Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore: The Johns Hopkins University Press, 1982), 142,144.

Helen now held an appropriate degree requisite to her pursuing further schooling. With full support from the bishop overseeing College of Saint Elizabeth, Bishop Bernard John McQuaid who had earlier counseled the Sisters running the college to "ensure that the faculty . . . was well educated," Sister Helen was given permission to study botany at the University of Chicago where she earned her M.S. in 1907 and in 1909 became the first Catholic sister in the United States to receive a doctorate.[20]

Unlike generations of Catholic men who received degrees from Georgetown and dozens of other Catholic colleges starting in the early 1800s, Catholic women waited until the turn of the century before they enjoyed this same academic honor. Now Catholic women's schools like the College of Saint Elizabeth could promote themselves utilizing wording like "confers degrees" to stand on an equal footing with other American female schools. For Saint Elizabeth's, this strength begat more strength, especially after Sister Helen returned to her alma mater to teach botany and other sciences along with forming a Botanical Club for her students. By 1914 the college advertised a Bachelor of Science as well as the Bachelor of Arts degree, another positive step in making the college attractive to Catholic families with daughters who wanted to learn science to accomplish their "individual life work."[21]

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[20] The authority of bishops over the institutions in a diocese was established in 1884 at the Third Plenary Council held in Baltimore as told in Mary J. Oates, "Sisterhoods and Catholic Higher Education, 1890-1960," in H. Tracy Schier, et al. (eds.), *Catholic Women's Colleges in America* (Baltimore: The Johns Hopknis University Press, 2002), 167. Oates also provides good historical details about how bishops and sisters navigated the question of higher education, see pages 178-181. Bishop McQuaid's strong support of College of Saint Elizabeth described in Fernada H. Perrone, ""A Well-Balanced Education": Catholic Women's Colleges in New Jersey, 1900-1970," *American Catholic Studies* 117:2 (2006), 1-31, 4-6. About Bishop McQuaid, see his entry in the Herbermann, et al. (eds.), *The Catholic Encyclopedia*,9:507-508.

[21] "College of Saint Elizabeth, Convent Station, near Morristown, New Jersey.," *New York Times*, August 15, 1903. "A Botanical Club at the College of Saint Elizabeth," *Trenton Evening News*, November 20, 1910. The B.Sc. degree mentioned in "College of Saint Elizabeth," *Cleveland Plain Dealer*, June 14, 1914, newspaper advertisement. Another newspaper advertisement spoke of the college offering an education suitable for "individual life work," something fundamental for every woman; see "College of Saint Elizabeth," *Dallas Morning News*, June 28, 1914.

By 1938 Cattell's directory catalogued 31 Catholic sisters in *American Men of Science*, including seven in botany and nine who had graduated from Catholic University of America once it opened its doors to women. No doubt members of this pioneering group were already "acquainted with one another and with one another's work" without the need of Cattell's directory given their unity within the Catholic Church, nonetheless at a minimum *American Men of Science* chronicled their influx into American science in response to the need to improve higher education opportunities for Catholic women, particularly in science and at lesser-known institutions.[22]

Cattell's Catholic Physicians

I have pinpointed 32 individuals, or nearly half of my 70 Cattell's Catholics, who pursued careers connected with some aspect of the medical arts (see Table 2). These Cattell's Catholic physicians, notably all male, received their medical training from 16 distinctive schools with the most graduating from a single institution: six (or 19%) who received M.D. degrees from the medical department of Georgetown University, a Jesuit institution situated in Washington, D.C. Given my search criteria that looked for affinities with Catholic institutions, this outcome offers little surprise, yet a closer examination of Georgetown's medical school reveals pragmatic reasons for this high number and points to the first of several insights to be gleaned from an analysis of these specific Cattell's Catholics.[23]

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[22] Rossiter, "Women Scientists in America before 1920," 144. Cattell (ed.), *American Men of Science: A Biographical Directory*, Preface to the First Edition. About 'lesser-known' institutions I agree with Linda Eisenmann who worries about historians "continued preoccupation with high-prestige institutions" which "minimizes the number of women who are studied" and "neglects investigations of the types of institutions where most women have negotiated their role in the academy." See her review article Linda Eisenmann, "Women, Higher Education, and Professionalization: clarifying the view," *Harvard Educational Review* 66:4 (1996), 858-873, 858-873, pg. 858.

[23] As a point of clarification, two Cattell's Catholic physicians, Eycleshymer and Lyon, obtained Ph.D. degrees, not M.D. degrees, as their credentials for work in the medical field. This 'problem' was fixed in 1911 after the Cattell's 1910 directory came out when their employer, the St. Louis University medical school, awarded them honorary

Like many American Catholic institutions of the day, Georgetown received students regardless of their religion as long as they were "of good moral character" and, for its new medical department, being twenty-one years of age or older along with meeting other stated requirements. In a similar vein, faculty at this medical school were not subjected to a religion requirement noting that, of the four physicians who established this department in 1851, just one was Catholic with the others being of different faiths. Thus, Georgetown's medical school eschewed religious affinity and instead put business-like emphasis on instruction in the various medical sciences. Moreover, the department did not require incoming students to have a prior degree, a requirement established at Georgetown in 1906 when the American Medical Association and Association of American Medical Colleges began to advocate for higher medical school standards. Again, little religious affinity appeared among these six Georgetown graduates as just one, James D. Morgan, obtained his degree from a Catholic institution (Georgetown) while three earned degrees from non-Catholic colleges and two had no degree prior to starting their medical studies. Only at the conclusion of their studies did a surprising affinity arise when four of these newly graduated Georgetown physicians opted to stay at their Catholic alma mater to teach, a move suggestive of a workable professional, and maybe a religious, bond that had developed between these graduates and the college such that they wanted to continue their mutual association. Thus, when it came to religious considerations, Georgetown erected no educational barriers to these six Cattell's Catholic physicians and when it became time for them to seek employment after graduation, this Catholic institution proved itself an attractive

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M.D. degrees "Honoris Causa" in June 1911; see "Annual Announcement of the School of Medicine," *Bulletin of St. Louis University* 7:2 (1911), 19. While Cattell deemed that only medical men qualified for inclusion in his 1910 AMOS, I know women M.D.s taught at one Catholic medical school where Mattie Arthur, M.D., effectively a lay professor, served as an assistant in anatomy; see list of faculty in *The John A. Creighton Medical College, Medical Department of the Creighton University, 1900-1901* (Omaha, 1900).

opportunity as it hired four of its newly minted M.D.s to join its teaching staff. However, when looking at Cattell's Catholic physician employment across all medical schools named in Table 2, neither Catholic nor non-Catholic institutions enjoyed hiring prominence, instead there appears to have emerged a balance between these choices, a parity which implies physician indifference to a school's religious circumstances in lieu of other reasons for accepting a professional position.[24]

A closer analysis of employment affiliations for the 32 Cattell's Catholic physicians reveals that 66% taught at one of the five Catholic medicals schools cited in Table 2 (Georgetown, St. Louis, Fordham, Creighton, and Marquette) while 72% taught at non-Catholic institutions, which totals over 100% because 13 out of 32 of these physicians, or 40%, taught at both kinds of institutions. Here a lack of barriers between Catholic and non-Catholic medical schools helps to confirm the medical arts operating essentially independent of religion. Indeed, for the five Catholic medical schools, all running under the auspices of the Jesuit Order, they explicitly took this stance given the Jesuit Constitution that specified "The study of medicine and laws, being more remote from our Institute, will not be treated in the universities of the Society, or at least the Society will not undertake this teaching through its own members." Moreover, if competition existed between Catholic and non-Catholic medical institutions when it came to hiring, then Georgetown and St. Louis won that contest handily in attracting the strongest talent with six out of the seven Cattell Catholic physicians who had earned stars from Cattell teaching at these two Jesuit schools even though they graduated from non-Catholic medical institutions.

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[24] *Catalogue of the Officers and Students of Georgetown College, District of Columbia, for the academic year 1853-54* (Georgetown: A. L. Settle, 1854), 10. The religions of the three other physicians were Episcopalian, Methodist, and Jewish per Curran, *The Bicentennial History of Georgetown University, Vol. 1: From Academy to University, 1789-1889*, 147. *A Catalogue of the Faculty and Students of Georgetown University 1906-1907* (Washington, D.C.: Georgetown University, 1906), 31. The efforts by the AMA and AAMC to raise medical school standards described in Starr, *The Social Transformation of American Medicine: The Rise of a Sovereign Profession and the Making of a Vast Industry*, 115-118. About American medical education in this period, see Martin Kaufman, "American Medical Education," in Ronald L. Numbers (ed.), *The Education of American Physicians* (Berkeley: University of California Press, 1980), 7-28.

Like Georgetown's successes in hiring its own graduates, that these half-dozen medical "stars" taught at Catholic institutions for at least part in their medical careers allows us to appreciate those schools under a rare spotlight held by the hand of science vis-à-vis Cattell's directory and not by the hand of religion.[25]

Based on the medical school names found in Table 2, geography positions most of these Cattell's Catholic physicians as having studied in or found institutional homes in major metropolitan cities along the American east coast or in growing commercial centers such as Chicago and St. Louis. Yet Cattell complained that these places, "in spite of their vast wealth and great universities, and the fact that the ambitious and successful are drawn to them, are failing to produce scientific men." Perhaps his opinion seemed true when scrutinizing all 5500 individuals listed in the 1910 AMOS on the whole, but for my smaller yet evidently talented subgroup of 32 M.D.s who, for the most part, were 'produced' by medical institutions located in these urban centers disparaged by Cattell, big city Catholic and non-Catholic medical schools actually represented the answer to his question concerning the "kind of education" being "most favorable to scientific productivity." Lest urban schools be assumed as superior, recall Sister Helen Angela flourishing at College of St. Elizabeth near Morristown, New Jersey, a rural institution located on several hundred acres of land depicted as "a picturesque Garden of Eden," no doubt something accomplished under her expert botanical guidance. Whereas botany

[25] *The Constitutions of The Society of Jesus and their Complementary Norms: A Complete English Translation of the Official Latin Texts*, 180. The early medical school history of St. Louis, Georgetown, and Creighton discussed in Freiburger, "'To Any Degree': Jesuit Medical Schools in the Nineteenth-Century United States," , 220-255. It should be noted that, like Georgetown, these other four Jesuit medical schools did not require a four-year degree for admission to their medical departments until after the turn of the century. A caveat: having one or more Cattell's Catholic stars on a faculty does not make a medical school great as can be seen with the middling reviews given to Georgetown and St. Louis in the 1910 Flexner report; see Abraham Flexner, *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching* (Boston: The Merrymount Press, 1910), pgs. 201-202 and 255 respectively.

bloomed predictably on a pastoral New Jersey campus, the medical arts in contrast to Cattell's view found fertile soil for their development in the larger American cities.[26]

Overall, Cattell granted physicians critical attention in his 1910 directory and conferred stars on 232 individuals working in many fields and sub-fields related to the medical arts. This worked out as roughly 19% of the 1201 stars that appeared next to scientific fields in this second edition and harmonizes with the seven out of 32 or 22% of my Cattell's Catholic physician's subset who gained this distinctive accolade. Another strong congruence between my subset of physicians and all physicians in the directory appears regarding their mostly being affiliated with a medical school; this comes from Cattell's pointed observation that "only three physicians not connected with medical schools have done scientific work of consequence." From these correspondences come a reasonable confidence that my earlier conclusions regarding Cattell's Catholic physicians displaying indifference toward a school's religious circumstances and finding good success in an urban setting bear out Catholic medical schools as auspicious places of learning and employment. No matter their small number, their productivity existed on par with similar American institutions as I have discerned via the information offered by Cattell's directory.[27]

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[26] Cattell, "A Further Statistical Study of American Men of Science," 640. College of St. Elizabeth stood two miles from the closest town, Morristown, population 12,507 according to the 1910 US Census, a number much in contrast to New York City, population 4,706,883, 40 miles distant. Garden of Eden quotation from the school's newspaper advertisement, see "Instruction Advertisements," *New York Tribune*, August 15, 1914, 13.

[27] The number of starred physicians in the 1910 AMOS calculated using data from Richard M. Pearce, "An Analysis of the Medical Group in Cattell's Thousand Leading Men of Science," *Science* 42:1078 (1915), 264-278, based on his census of just those working in medicine and not science writ large. From page 267, I add 179 physicians starred in 1906, the 59 new physicians starred in 1910, less the 6 who died in the intervening years, yielding a total of 232. Cattell "again selected" the "thousand leading men of science" to receive stars in his 1910 directory, with obvious overlap of names to the 1000 stars assigned the 1906 first edition directory. He explains this situation in his preface where "269 new men . . . have obtained places on the list" while "68 who died or were removed" was mentioned later in the volume, giving a total of 1201 (1000 + 269 – 68 = 1201). See preface and page 568 in Cattell (ed.), *American Men of Science: A Biographical Directory*, respectively. Cattell (ed.), *American Men of Science: A Biographical Directory*, 584.

Honorary Cattell's Catholics

In compiling his 1906 directory, Cattell deemed it important to solicit biographical details that included "honorary degrees and other scientific honors" for each individual listed. While he situated LL.D's as being "no more reputable" than "Gemeinrats, knights, and academics" as a sign of status or other societal reward when it came to science, this information evidently had some value in fostering exchanges among scientific men vis-à-vis his directory. In the 1910 AMOS Cattell's own entry listed his 1907 LL.D. degree awarded by his alma mater Lafayette College. While Cattell spurned using honorary degree details in his 1910 *Further Statistical Study of American Men of Science*, my analysis of Cattell's Catholics profits from this data in understanding better the state of American Catholic higher education.[28]

Twelve Cattell's Catholics received honorary degrees from six Catholic institutions out of the approximately 40 colleges and universities then in operation for the years before 1910 that had charters allowing them to grant Bachelor and higher degrees (see Table 3). Besides Catholic University of America, a Pontifical institution founded on behalf of all Catholics and Catholic orders, five other institutions granted these honorary degrees including four Jesuit institutions. Of the remaining 35 or so institutions, 15 were run by Jesuits, so mitigating anything unique to that order, five were female colleges that were not yet able to award honorary degrees by 1905, and the remaining 15 were operated by their local diocese or belonged to other Catholic orders. As an example of the latter case, Manhattan College in New York City, an institution

[28] The text of Cattell's generic directory information request letter appeared in J. McKeen Cattell, "A Biographical Directory of American Men of Science," *Science* 21:545 (1905), 899, 899, and included nine distinct categories of desired data with category 7 being "honorary degrees and other scientific honors." Cattell (ed.), *American Men of Science: A Biographical Directory*, 579. Cattell (ed.), *American Men of Science: A Biographical Directory*, 79. Cattell's Doctor of Laws degree was one of the many honorary degrees awarded at the college's Diamond Jubilee Commencement on June 19, 1907; see "General Catalogue 1907-1908," *Bulletin of Lafayette College* 2:2 (1908), 152. Later Cattell would receive a Sc.D. honorary degree from the University of Arizona in 1924 and a D.H.L honorary degree from Wittenberg College in 1928.

attentive to teaching science run by the Christian Brothers order, awarded two honorary degrees in 1903: a M.A. to John James Frawley and a Litt.D. to Martin Keogh, a state senator and supreme court justice respectively. Lest these two honorary degrees imply a low priority toward science, the college also conferred eight B.S., three M.S., and five C.E. degrees at the same June 23, 1903, ceremony. Hence there existed nothing innate or exclusive to these six awarding institutions and not to others, that these dozen Cattell's Catholics came by their honorary degrees owing to different motivations entangled with a clear reverence for science.[29]

What about religion being an underlying motive for conferral of these twelve honorary degrees? Of the awardees, Connolly, Murphy, Searle, and Walsh can be positively confirmed as Catholic while the others appeared to be otherwise. While being Catholic may have eased their selection to receive honorary degrees, that someone was not a Catholic did not bar them from an invitation for equivalent recognition. Accordingly, with religion set aside, the foremost qualification for an honorary degree became a matter of recognized expertise in a visible scientific field followed by acknowledged service to education or Catholicism. Little doubt the attached notoriety would be appreciated by all concerned as part of the overall calculus regarding this kind of accolade. Still, for the Rev. Searle and his 1896 honorary Ph.D. from Catholic University of America where he held the position of professor of astronomy and mathematics, conferral of a customarily earned degree remedied the appearance of a deficiency for a faculty member whose highest degree was his 1860 M.A. from Harvard, but at the risk of being seen as self-serving. As noted with the pressures on female American Catholic institutions to employ

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[29] Honorary degrees determined using AMOS directory details. The institutional total and other statistics determined using author's database of Catholic colleges and universities. No attempt was made to inventory honorary degrees granted to Catholics by non-Catholic institutions using AMOS data, an interesting proposal for another day. Based on a survey from the early 1940s that stated "Catholics have so little chance of being honored by a State University or Protestant College," the numbers appeared to be small; see Stephen Edward Epler, *Honorary Degrees: A Survey of their Use and Abuse* (Washington, D.C.: American Council on Public Affairs, 1943), 128. *Manhattan College Annual Catalogue 1902-1903* (New York City: The Meany Printing Co., 1903), 112, 114.

instructors with advanced academic credentials, male Catholic institutions likewise felt the need to put their best face forward, particularly when it came to teaching science at a school like the newly founded Catholic University of America.[30]

The earliest honorary degree awarded to a Cattell's Catholic went to well-known astronomer and geologist George Davidson at the 1876 commencement activities marking the 25th anniversary of Santa Clara College in California. Davidson, then responsible for the U.S. Coast Survey on the Pacific Coast, received the school's first honorary degree, a Doctor of Philosophy degree, a move by the college that not only aligned with its reputation as "a favorite abode of science," it pointed out how this school worked to be part of the rising scientific community in the region. Here the secular unity of science found itself on display, that Davidson, an Episcopalian, could easily share the stage at this Jesuit college would not be a point lost on the broader, non-Catholic community. Likewise, the functional wisdom of selecting this distinguished scientist went beyond enhancing the college's visibility, it exhibited its earnest appreciation of science to any potential students in the audience, Catholic or otherwise, who someday might receive their own science diploma from Santa Clara as did the four B.S. degree recipients that year. Thus, the conferring of an honorary degree to a non-Catholic like Davidson by a Catholic institution declared publicly that within the boundaries of Catholicism, modern science not only had a home, but that it thrived in that home.[31]

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[30] For details about Searle's doctorate, awarded March 1896, see "Feast of St. Thomas - Conferring of Degrees," *The Catholic University Bulletin* 2:2 (1896), 217-219. While university rules barred "merely honorary degrees" in the sacred sciences, the school of philosophy was not similarly restricted; see *The Catholic University of American: Official Announcements for the Scholastic Year 1890-91* (Philadelphia: Hardy & Mahony, 1890), 19. Requirements for degrees discussed in Nuesse, *The Catholic University of America: A Centennial History*, 97-98. Founded in 1887, Catholic University did not award its first science doctorate until 1902 to Theodor Holm, one of Cattell's Catholic stars in botany.

[31] "Santa Clara College," *San Jose Mercury*, June 7, 1876. Davidson's many official positions in California and beyond outlined in Charles B. Davenport, "Biographical Memoir of George Davidson, 1825-1911," *National Academy Biographical Memoirs* XVIII (1937). Opened in 1851, Santa Clara put an early emphasis on teaching

As a science, astronomy posed few issues for Catholicism when it came to teaching or, in the case of Honorary Cattell's Catholics, celebrating. Four of twelve honorary degree recipients worked in this field, two of them Cattell's Catholic stars, so when coupled with existing public interest, if not enthusiasm, for the subject, astronomy worked well as the grounds for Catholic institutions to exult and self-promote. However, when it came to Edward S. Holden, one of these Catholic stars, who accepted an honorary Litt.D. degree from Fordham University in 1910 after an active career, first in astronomy and then in science writing, this degree served like a 'thank you' to a long-time scientific friend of the Church. From Holden's early collaborations with Jesuit astronomer John Hagen to *The Catholic World* review of Holden's 1888 *Handbook of the Lick Observatory of the University of California* to Holden's engagement with "The Conflict of Religion and Science" in which he offered backhanded remarks on Andrew Dickson White's 1896 *A History of the Warfare of Science with Theology in Christendom*, Holden and Catholicism orbited each other for decades to the pragmatic benefit of all parties. Fordham University, an urban institution sans observatory, attentive to astronomy but not invested in the subject, simply confirmed in a public way the virtue of teaching about the heavens in its classrooms by venerating this one Cattell's Catholic star.[32]

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science, see the *Prospectus of Santa Clara College, with a catalogue of the officers and students for the year 1854-5*, 4. About Santa Clara efforts at reaching out during the 1870s, see McKevitt, *The University of Santa Clara: A History, 1851-1977*, 106-7. By 1876, Santa Clara had awarded 37 B.S. degrees versus 19 B.A. degrees, a 2:1 ratio that bespeaks the priority accorded to science at this college; see McKevitt, *The University of Santa Clara: A History, 1851-1977*, 326.

[32] The Catholic Church has a long history of friendliness toward astronomy as told in J. L. Heilbron, *The Sun in the Church: Cathedrals as Solar Observatories* (Cambridge, Mass.: Harvard University Press, 1999). According to my database of American Catholic colleges and universities, thirteen had observatories circa 1900 when Cattell started collecting data for his directory project. *Catalogue 1909-1910 Fordham University* (New York City: Fordham University, 1910), 445. About Holden, see W. W. Campbell, "Biographical Memoir of Edward Singleton Holden 1846-1914," *National Academy Biographical Memoirs* VIII (1916). Before Hagen became the first director of the Vatican Observatory in 1906, he taught astronomy and mathematics at Campion College, a now closed Catholic school in Wisconsin, and received assistance from Holden, then director of Washburn Observatory at the University of Wisconsin-Madison, in setting up an observatory; see "Varia: Father Hagen's Old Observatory," *Woodstock Letters* 47:2 (1918), 263-4. Hagen and Holden working together on a joint publication reviewed in "Scientific

These twelve honorary degrees sensitize us to overlooked undercurrents of science operational in American Catholic higher education in the decades leading up to Cattell's 1910 directory. About the six grantors of these degrees, one can observe a sincere appreciation for science not just on the commencement stage, but at the institutional level as well where Santa Clara, Georgetown, Notre Dame, and others put a candid emphasis on science. At the individual grantee level the Rev. Searle's honorary degree bolstered his academic credentials at a time when it was expected that university professors hold doctorate degrees as science education became more competitive around the turn of the century. While George Davidson's honorary degree from Santa Clara College offers good evidence of modern science having a confirmed home in a Catholic college curriculum, Holden's honorary degree went further in acknowledging that science knew no boundary between Catholic and non-Catholic scientists when it came to the pursuit of science. And last, in contradiction of a 1943 study that indicated "Catholics gave four-fifths of the honor to their own church members," when it came to these Honorary Cattell's Catholics, it would be non-Catholics who accounted for two-thirds, or not quite four-fifths, of the total honorary degrees awarded. Furthermore, none of these honored individuals actually studied at a Catholic institution of higher education, including the four known Catholics, thus situating them as unexpected examples of "the kind of education" found at the intersection of science, education, and Catholicism that Cattell sought.[33]

Chronicle: Scientists among the Clergy," *American Catholic Historical Quarterly* 11:42 (1886), 365-366. Edward S. Holden, *Handbook of the Lick Observatory of the University of California* (San Francisco: The Bancroft Company, 1888) reviewed appreciatively in "New Publications," *The Catholic World* 47:281 (1888), 717. Holden's reproach on White made in Edward S. Holden, "The Conflict of Religion and Science," *The Popular Science Monthly* 65 (1904), 289-297, esp. pg. 297.

[33] Epler, *Honorary Degrees: A Survey of their Use and Abuse*, 128.

Conclusion

In 1910 Cattell spoke of "the advantage of statistics over general impressions" after disclosing that some of his "figures came as a surprise" based on the biographical details he had gathered and analyzed." Likewise, my assessment utilizing the same data, but for the Cattell's Catholics subgroup, revealed some surprises while confirming various persistent impressions concerning Catholics and their schools. Like Cattell, I utilized this detailed directory to do something new by putting 'Catholic' scientists and their circumstances within American science in a fresh light with the following main findings.[34]

Across all four frameworks used to interrogate Cattell's data about my 70 Cattell's Catholics, I found American Catholic higher education obviously attentive to teaching science though their production of graduates existed at a level much lower than their non-Catholic peers. That only 70 Cattell's Catholic could be located in a directory of 5500 names confirms this one stark fact. Despite their low numbers, the percentage of the 70 Cattell Catholics who received 'star' status stood higher than the value for the directory overall, 27% versus 22% respectively, which calls our attention to the operative quality of the Catholic institutions allied with these 70 individuals, that a Catholic education, either in full or part, could lead to a successful career and recognition in American science. Counter to Bruce's claim of Catholic individuals in science being scarce, here was available evidence about Catholics and the kind of education they pursued that Bruce (and even Cattell) seemingly failed to appreciate.

Three distinctive purposes to which these 70 Cattell's Catholics put their educations emerged out of my analysis. Surprisingly, the majority were found pursuing careers related to medicine where an additional unanticipated result appeared with these 32 physicians showing no

[34] Cattell, "A Further Statistical Study of American Men of Science," 688.

tangible affinity to religion regarding either their choice of institution for medical studies or ensuing employment. Less of a surprise was how teaching served as the purpose that motivated Sister Angela, Edward Pace, and others to effect improved Catholic higher education. As the lone female among the 70 Cattell's Catholics, Sister Angela put her Ph.D. in botany to effectual use at one of the few degree-granting institutions for Catholic women while Pace contributed to Catholic University realizing its goal of graduating science-qualified Ph.D.s, including one who ultimately would be listed in Cattell's directory. Lastly, research that advanced science gained Cattell's attention and showed why some Cattell's Catholics had a fitting, though modest, place in his directory. At times, these purposes stood at odds with each other as when Jesuit astronomer Fr. Hagen gave higher priority to his research over teaching duties, in effect making a compromise between advancing science versus furthering Catholic higher education. This devil's tradeoff rivals my choosing between critiquing American Catholic higher education for its low productivity versus granting it merit based on the quality of the few teachers and scientists it did produce.

Religious impartiality emerged often during my investigation of Cattell's Catholics. For Thomas Chatard and Sister Angela, their Bachelor degrees from Catholic colleges readily enabled them to matriculate sans discrimination at Harvard and the University of Chicago respectively. Likewise non-Catholic medical students enjoyed a professional welcome from the Catholic medical schools mentioned earlier as did non-Catholic medical professors who taught at these institutions, which calls attention to how the medical sciences remained separate from religion when Cattell Catholic physicians made educational choices and career moves. In contrast, honorary degrees conferred by Catholic institutions on non-Catholics like Edward Holden and George Davidson exemplified how science and religion could appear together

deliberately on the same commencement stage to the benefit of both worldviews. In general, religion acted neutral, although not entirely out of the picture, when it came to my 70 Cattell's Catholics and "the kind of education" they pursued and furthered while securing their places in Cattell's directory owing to their studying, teaching, and researching in science.

Overall, Cattell's directory echoed the changing status of American Catholic higher education. It provides us with a historical window to see where Catholics and their schools stood, and usefully hints at where these institutions might be moving. Though few in number, these 70 Cattell's Catholics stood conspicuously among the leading American men and women of science and heralded that there was much for Catholic higher education to be proud, yet that serious problems existed as well.[35]

[35] A "conspicuous dearth of scientists among the Catholics" remained visible decades after my analysis of data gleaned from Cattell's 1910 *American Men of Science*; see Harvey C. Lehman, et al., "Scientific Eminence and Church Membership," *The Scientific Monthly* 33:6 (1931), 544-549, pg. 549.

Table 1 - Cattell's Catholics from the 1910 edition of *American Men of Science*

Page	Name	Fields(s)
4	Adams, Dr. Samuel S.	Medicine
7	Algué, Rev. Joseph, S.J.	Meteorology
12	Angela, Sister Helen	Botany
20	Baker, Dr. Frank	**Zoology*, Anatomy
29	Bassett, Dr. Victor H.	Pathology
42	Bishop, Dr. L. Faugeres	Medicine
44	Blair, Dr. Viliay Papin	Anatomy
55	Brennan, Dr. Martin S.	Astronomy, Geology
57	Brock, Prof. Henry M., S.J.	Physics
68	Burrow, Dr. N. Trigant	Psychology
72	Cameron, Dr. Frank K.	**Chemistry*
83	Chatard, Dr. Thomas M.	**Chemistry*
97	Connolly, Dr. John M.	Pediatrics
99	Coony, Rev. John P., S.J.	Chemistry, Mathematics
112	Davidson, Prof. George	Geodesy, Geography, Astronomy
116	Dawbarn, Prof. Robert H. M.	Surgery, Anatomy
123	Dodds, Prof. Gideon S.	Zoology
133	Dwight, Prof. Thomas	**Anatomy*
135	Edes, Dr. Robert T.	Pathology
145	Eycleshymer, Prof. Albert C.	**Anatomy*, Histology, Embryology
147	Fargis, Rev. George A., S.J.	Chemistry, Astronomy
151	Field, Dr. Cyrus W.	Pathology, Bacteriology
155	Fitzpatrick, Dr. Charles B.	Hygiene, Medicine
158	Foote, Prof. James S.	Physiology, Histology
165	Friedenwald, Prof. Julius	Medicine
184	Green, Prof. Jerome J.	Physics, Electrical Engineering
185	Greene, Dr. Edward L.	**Botany*
186	Griffin, Prof. John J.	Chemistry
190	Hagen, Rev. John G., S.J.	**Mathematics*, Astronomy
204	Hay, Prof. William P.	Zoology
215	Hillig, Rev. Frederick J., S.J.	Physics, Physical Chemistry
220	Holden, Dr. Edward S.	**Astronomy*
221	Holm, Dr. H. Theodor	**Botany*
227	Howard, Dr. Leland O.	**Entomology*
241	James, George W.	Ethnology, Archeology

Page	Name	Field(s)
243	Jelliffe, Dr. Smith E.	Neurology, Psychiatry
254	Kelly, Dr. Aloysius O. J.	Medicine, Pathology
255	Kendall, Dr. William C.	Zoology
260	Kinyoun, Dr. Joseph J.	**Pathology*
261	Kirsch, Rev. Alexander M	Zoology
264	Kober, Dr. George M.	Hygiene
268	Lamb, Dr. Daniel S.	Medicine, Anthropology
291	Lyon, Prof. Elias P.	**Physiology*
292	McAdie, Prof. Alexander G.	Meteorology, Climatology
297	McDonough, Dr. Eduard J.	Histology
300	McKenna, Dr. Charles F.	Chemistry
317	Melville, Rear Admiral George W.	**Mechanical Engineering*
333	Morgan, Dr. James D.	Medicine
340	Murphy, Dr. John B.	Surgery
346	Nieuwland, Prof. Julius A.	Chemistry, Botany
349	O'Donovan, Dr. Charles	Therapeutics, Clinical Medicine
355	Pace, Prof. Edward A.	**Psychology*
357	Palmer, Dr. Theodore S	Zoology
367	Perrine, Prof. Charles D.	**Astronomy*
376	Potamian, Brother Michael F. O.	Physics
388	Reisinger, Dr. Emory W.	Anatomy, Medicine
393	Richmond, Dr. Charles W.	Ornithology
394	Rigge, Prof. William F., S.J.	Astronomy
400	Rosenau, Dr. Milton J.	**Preventive Medicine*, Hygiene
418	Searle, Rev. George M.	Astronomy
423	Shea, Prof. Daniel W.	**Physics*
431	Sloane, Dr. T. O'Conor	Physics
434	Smith, Dr. Ernest E.	Physiology, Chemistry
436	Smith, Dr. Hugh M.	Ichthyology
452	Stiles, Dr. C. Wardell	**Medical Zoology*
484	Vaughan, Prof. George T.	Surgery
492	Walsh, Prof. James J.	Pathology
493	Ward, Dr. Samuel B.	Medicine
529	Zahm, Prof. Albert F.	**Mechanics*
530	Zahm, Rev. John A.	Physics

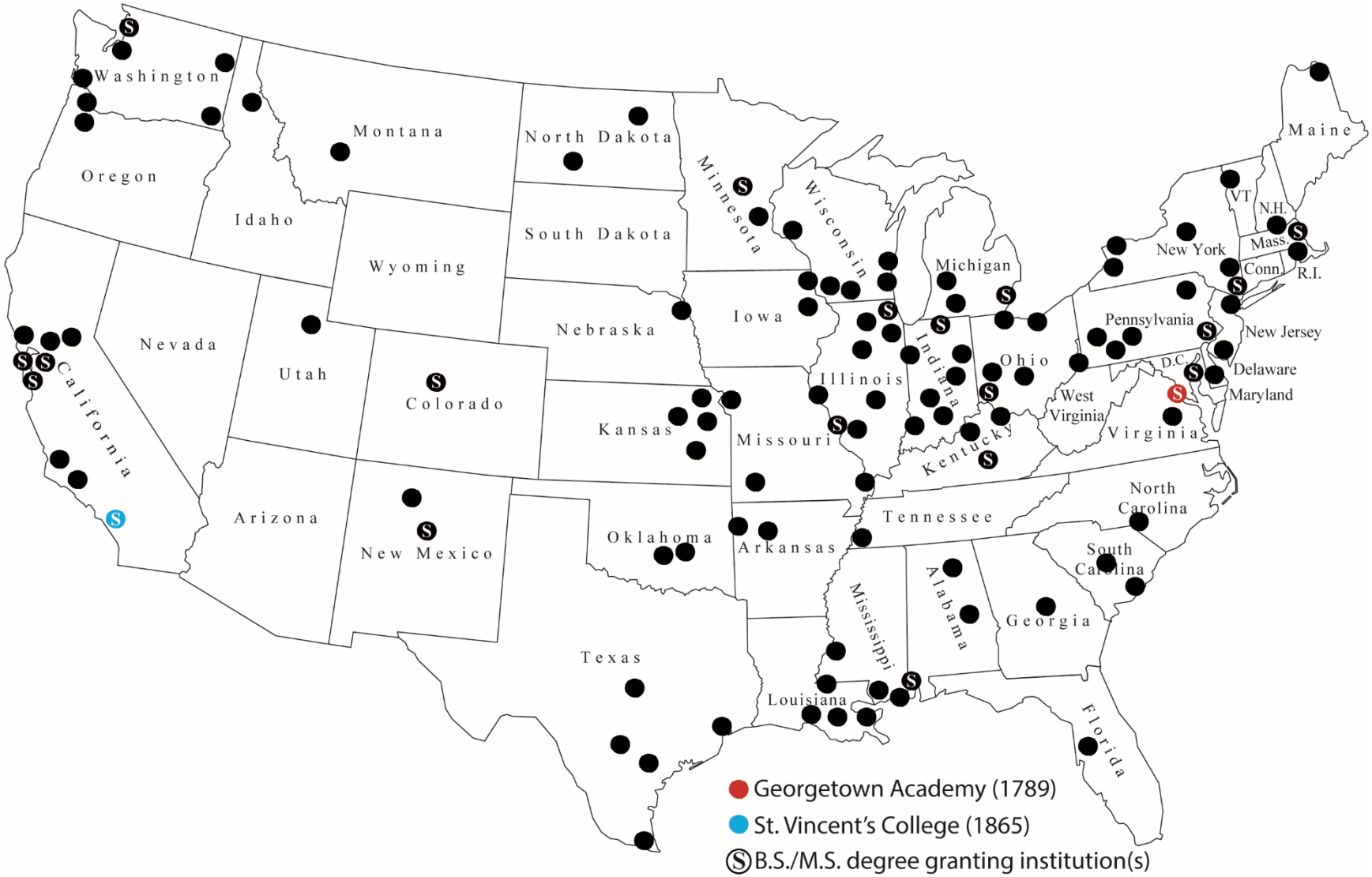
Table 2 - Cattell's Catholic Physicians from the 1910 edition of *American Men of Science*

Page	Name	Field	Education received at a:		Taught or worked at a:	
			Catholic Med School	Non-Catholic School	Catholic Med School	Non-Catholic school/inst.
4	Adams, Dr. Samuel S.	Medicine	1879, Georgetown		Georgetown	George Washington
20	Baker, Dr. Frank	*_Zoology_, Anatomy		1880, George Washington	Georgetown	
29	Bassett, Dr. Victor H.	Pathology		1903, Johns Hopkins	Marquette	Northwestern, Wisconsin
42	Bishop, Dr. L. Faugeres	Medicine		1889, Columbia	Fordham	
44	Blair, Dr. Viliay Papin	Anatomy		1893, Washington University		Washington University
68	Burrow, Dr. N. Trigant	Psychology		1899, Virginia		
97	Connolly, Dr. John M.	Pediatrics		1900, Harvard		Harvard
116	Dawbarn, Prof. Robert H. M.	Surgery, Anatomy		1881, Columbia	Fordham	
133	Dwight, Prof. Thomas	*_Anatomy_		1867, Harvard		Harvard, Maine
135	Edes, Dr. Robert T.	Pathology		1861, Harvard	Georgetown	Harvard
145	Eycleshymer, Prof. Albert C.	*_Anatomy_, Histology, Embryology		1894, Chicago	St. Louis	Rush Medical
151	Field, Dr. Cyrus W.	Pathology, Bacteriology		1900, Yale	Fordham	Columbia
155	Fitzpatrick, Dr. Charles B.	Hygiene, Medicine		1890, Columbia	Fordham	New York Hospital
158	Foote, Prof. James S.	Physiology, Histology		1881, Columbia	Creighton	
165	Friedenwald, Prof. Julius	Medicine		1890, Physicians College		Physicians College Baltimore
243	Jelliffe, Dr. Smith E.	Neurology, Psychiatry		1889, Columbia	Fordham	New York College
254	Kelly, Dr. Aloysius O. J.	Medicine, Pathology		1891, Pennsylvania		Pennsylvania
260	Kinyoun, Dr. Joseph J.	*_Pathology_		1882, Bellevue	Georgetown	George Washington
264	Kober, Dr. George M.	Hygiene	1873, Georgetown		Georgetown	
268	Lamb, Dr. Daniel S.	Medicine, Anthropology	1867, Georgetown			Howard
291	Lyon, Prof. Elias P.	*_Physiology_		1897, Chicago	St. Louis	Bradley Inst., Rush Medical
297	McDonough, Dr. Eduard J.	Histology		1892, Medical School of Maine		Medical School of Maine
333	Morgan, Dr. James D.	Medicine	1885, Georgetown		Georgetown	
340	Murphy, Dr. John B.	Surgery		1879, Rush Medical College		Northwestern
349	O'Donovan, Dr. Charles	Therapeutics, Clinical Medicine		1881, Maryland		Women's College of Baltimore
388	Reisinger, Dr. Emory W.	Anatomy, Medicine	1893, Georgetown		Georgetown	
400	Rosenau, Dr. Milton J.	*_Preventive Medicine_, Hygiene		1889, Pennsylvania	Georgetown	Harvard
434	Smith, Dr. Ernest E.	Physiology, Chemistry		1898, Bellevue	Fordham	Yale
452	Stiles, Dr. C. Wardell	*_Medical Zoology_		1890, Leipzig	Georgetown	Army Medical School
484	Vaughan, Prof. George T.	Surgery		1879, Virginia	Georgetown	U.S. Public Health Service
492	Walsh, Prof. James J.	Pathology		1895, Pennsylvania	Fordham	
493	Ward, Dr. Samuel B.	Medicine	1864, Georgetown			Albany Medical College
	32 total physicians	7 of 32 (22%) awarded stars	6 of 32 (19%)	26 of 32 (81%)	21 of 32 (66%)	23 of 32 (72%)

Table 3 - Cattell's Catholics Honorary Degrees from 1910 edition of *American Men of Science*

Page	Name	Field(s)	Honorary Degree / Granting Institution	Year	Religion
97	Connolly, Dr. John M.	Pediatrics	LL.D., Fordham University	1910	Catholic
112	Davidson, Prof. George	Geodesy, Geography, Astronomy	Ph.D., Santa Clara College	1876	Episcopalian
185	Greene, Dr. Edward L.	**Botany*	LL.D., Notre Dame University	1895	Episcopalian
220	Holden, Dr. Edward S.	**Astronomy*	Litt.D., Fordham University	1910	non-Catholic
227	Howard, Dr. Leland O.	**Entomology*	Ph.D., Georgetown University	1896	non-Catholic
241	James, George W.	Ethnology, Archeology	Litt.D., Santa Clara College	1907	Methodist
292	McAdie, Prof. Alexander G.	Meteorology, Climatology	M.S., Santa Clara College	1909	non-Catholic
317	Melville, Rear Admiral George W.	**Mechanical Engineering*	LL.D., Georgetown University	1899	non-Catholic
340	Murphy, Dr. John B.	Surgery	M.A., St. Ignatius College, Chicago LL.D., St. Ignatius College, Chicago	1894 1895	Catholic
367	Perrine, Prof. Charles D.	**Astronomy*	Sc.D., Santa Clara College	1905	non-Catholic
418	Searle, Rev. George M.	Astronomy	Ph.D., Catholic University of America	1896	Catholic
492	Walsh, Prof. James J.	Pathology	LL.D., Fordham University Litt.D. Georgetown University	1900 1910	Catholic

Map 7 - Catholic Educational Institutions founded over the years 1789 to 1900



Conclusion

To summarize, I have made a detailed study of American Catholic higher education during the nineteenth century regarding its efforts to teach science to both men and women. Catholics opened more than 200 new schools throughout the United States, and I found that institutions attentive to teaching science usually survived. Next, many viewed the teaching of science seriously enough to challenge traditional Catholic educational norms to improve their curricula by teaching novel subjects and conferring new academic degrees. However, not all Catholic colleges and universities were evenly responsive to the developing needs of American education as religion did not promote the teaching of all science subjects equally, thus leaving some Catholic institutions more adept at the teaching of science than others. Consequently, by the end of the nineteenth century when Catholics could claim about 170 operational schools, I have shown that they produced just a small number of acknowledged Catholic scientists. This was the place of science in nineteenth-century American Catholic higher education.

In 1899 when Charles W. Eliot, president of Harvard University, disparaged the Jesuits and their colleges for adhering to a curriculum unchanged for four centuries sans "some trifling concessions made to natural science," he somehow ignored this past century of attention given to the teaching of science by American Catholic colleges and universities. Not only did science help these institutions take root, but it also contributed to their becoming an acknowledged part of the national educational landscape amid schools operated by state governments, Protestants, Mormons, and other groups. In the preceding chapters I have shown how science captured a confirmed place in Catholic institutions of higher learning where, in sharp contrast to Eliot's low opinion, they proved responsive to the needs of students who desired instruction in the sciences

ranging from aeronautical engineering to zoology. The teaching of science was there to be seen, but Eliot failed or decided not to see it, even when it existed four miles away at Boston College, an institution run by the Jesuits which conferred its first Bachelor of Science degree on Francis M. Brogan ten years earlier.[1]

Perhaps Eliot's negative view of Catholic higher education was not entirely mistaken and that Catholic institutions shouldered some responsibility in failing to make science visible, if not more commonplace, across its many schools. Table 4 lists the twenty-five Catholic colleges and universities that granted Bachelor of Science degrees (noting that fourteen belonged to the Jesuit order) which accounts for barely 15% of the total number of Catholic institutions operating at the time of Eliot's criticism. Though this handful of Catholic schools made teaching science routine in their classrooms, they unfortunately also made it generally imperceptible to the world outside of themselves and their immediate patrons. A concluding example about one Catholic scientific course graduate makes this point about Catholic institutions and their teaching of science plainly visible.

Rodney D. White received his Bachelor of Science diploma (Figure 1) from St. Vincent's College in Los Angeles on the evening of June 21, 1900, when he gave a commencement speech about the "Progress of Science during the Nineteenth Century." While White and his classmates "startled the night air with their college cheers," this event otherwise made little noise beyond the commencement hall except for several moments of "great applause." Awarded a degree stamped

[1] Charles W. Eliot, "Recent Changes in Secondary Education," *Atlantic Monthly* 84 (1899), 433-444, pg. 443. A larger history behind Eliot's statement is well presented in Kathleen A. Mahoney, *Catholic Higher Education in Protestant America: The Jesuits and Harvard in the Age of the University* (Baltimore: Johns Hopkins University Press, 2003). Brogan graduated on June 27,1889, the only B.S. degree among the other eighteen B.A.'s awarded that day; see *Catalogue of the Officers and Students of Boston College 1888-1889* (Boston: Cashman, Keating & Co., 1889), 31. From 1851 to 1905 the B.S. degree was conferred only upon students registered in the Lawrence Scientific School at Harvard University and not from Harvard proper; from *Quinquennial Catalogue of the Offices and Graduates of Harvard University 1636-1910* (Cambridge, Massachusetts: Published by the University, 1910), 413.

Figure 1 - B.S. degree awarded to Rodney D. White, St. Vincent's College, CA (1900)
(from the archives of Loyola Marymount University, Los Angeles, California)

PRAESES ET CURATORES
COLLEGII SANCTI VINCENTII,
IN CIVITATE ANGELORUM, CAL.

OMNIBUS HAS LITTERAS PERLECTURIS SALUTEM

Cum notum sit Rodney D White, Virum moribus inculpatum, literarum ac scientiarum studia diligenter consequutum esse, Eum pro auctoritate nobis concessa,

SCIENTIARUM BACCALAUREUM

constituimus, atque singulis juribus, privilegiis et honoribus ad istum gradum pertinentibus, frui et gaudere jussimus.

Cujus rei haec membrana Collegii sigillo et Praesidis ac Scribae chirographo munita, testimonio sit.

Ex Aedibus Collegii Sancti Vincentii,
Undecimo Kalendas Julii, Anno Domini MDCCCC.

Joannes A. Lynch, C. M. Praeses.

Franciscus X. McCabe, C. M. Scriba.

with a gold leaf seal adorned by ribbons and written entirely in Latin, White's diploma conveyed an evident academic seriousness even thought it was written in a language White would not have encountered in his four years at St. Vincent's on its scientific course. Despite that, this document helped White become a successful certified accountant in the Seattle area, an occupation needing little in the way of science but one that likely allowed his St. Vincent mathematics courses to pay good dividends. In contrast to the satisfaction felt by Catholics a century earlier in opening their first institution of higher learning at Georgetown, White's graduation with a B.S. degree from one of the now many American Catholic colleges merely generated an evening of modest cheers and applause. Catholics were indeed teaching science in their numerous schools, but in 1900 anyone, apparently including President Eliot, could be hard pressed to know it.[2]

I think it likely that President Eliot at Harvard knew nothing about St. Vincent's College, a successful institution with a non-trifling four-year scientific course of mathematics, astronomy, chemistry and physics (with experiments), and the appropriate-for-California subject of geology. These science courses weren't concessions made under duress to comply with Catholic religious edicts or outdated traditions, but in contrast they encompassed subjects taught knowing full well how attractive they were to students which in turn helped to ensure institutional survival. Along with a two-year commercial course which mainly taught bookkeeping, elementary mathematics, but no science, and the time-honored classical course with ample Latin and Greek, St. Vincent's

[2] Details about White's commencement exercise from "St. Vincent's College: Annual Graduation Exercises Held Last Evening," *Los Angeles Time*, June 22,1900, 110. White's diploma photographed at LMUA. Opened in 1865 by the Vincentian Fathers order, the college was taken over by the Jesuits in 1918 and renamed Loyola Marymount College. At St. Vincent's and most American Catholic colleges, students taking a collegiate scientific course studied the modern languages, rarely Latin or Greek. Also, as best as I can find, White was not a Catholic. Given Marsden's view that that Catholic colleges and universities "had little to do with setting the standards that eventually prevailed in American academic life," i.e., that Catholics deserved no credit for instigating the rise of B.S. and M.S. degrees in American higher education, challenging this opinion would be a valuable avenue of future research; see George M. Marsden, *The Soul of the American University: from Protestant Establishment to Established Nonbelief* (New York: Oxford University Press, 1994), preface.

showed itself wisely responsive to the varied needs of students in the Los Angeles area. And as one would expect for a Catholic college, St. Vincent's required a class on Christian Doctrine for all three courses. Altogether this college's scientific course satisfied the goals first proposed for Georgetown Academy, an institution for Catholic higher education established by the Rev. John Carroll at the dawn of the American nation, as St. Vincent's College "communicated science" to its students while "guarding and improving" their morals. Evidently this course and twenty-four like it at other American Catholic institutions simply failed to satisfy (or be seen) by Eliot.[3]

While Eliot is beyond the reach of my research in showing how he misread the place of science in nineteenth-century American Catholic higher education, other scholars are not. By taking a detailed and overdue look at the teaching of science by Catholics, I provide a valuable corrective to our understanding of American Catholic higher education, one that not only reveals Catholics attentive to science, but at times that they and their schools were quite good at teaching it during the nineteenth century. No longer should narratives about Catholics showing them as having little interest in the teaching of science in their schools be uncritically accepted.[4]

My conclusions suggest multiple interventions into the histories of science, education, and religion. First, to acknowledge Catholics and their schools displayed a definite interest in teaching science contrary to numerous histories; second, to show how local conditions shaped

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[3] From chapter 1 about Georgetown Academy where Carroll indicated that "the object of the proposed institution is to unite the means of communicating science with an effectual provision for guarding and improving the morals of youth"; quotations taken from the printed broadside written by John Carroll, dated 1787, GTUA.

[4] For example, I would be critical of a 2018 article by Michael Rizzi who describes American Catholic institutions as being locked into a curriculum determined by the *Ratio Studiorum*, thus unable to compete in science with larger non-Catholic schools which benefitted from the Morrill Land Grant College Act of 1862, which was not the case in the ways science came into the Catholic college classroom as shown in my first four chapters; see Michael T. Rizzi, "We've Been Here Before: A Brief History of Catholic Higher Education in America," *Journal of Catholic Higher Education* 37:2 (2018), 153-174, pg.158. I would be more critical of John D. Cunningham, S.J., who wrote that "the nineteenth through mid-twentieth centuries were not a positive time for the study of science in American Catholic universities and college," again something my main chapters refute; see John D. Cunningham, S.J., "The Study of Science in Catholic Higher Education in the United States: A Modern Nuisance?," *Integritas* 3:2 (2014), 1-19, pg. 12.

what sciences needed to be taught, how much of each science was taught and by whom, all in conformance to the concerns of Catholicism; third, to confirm that, while Catholics did teach ample science in their many schools, outcomes were uneven when compared school to school and between Catholic schools and non-Catholic schools. As science still flourishes in Catholic colleges and universities to this day, much more research can and should be done.

In closing, I hope my dissertation (and its many references) provides encouraging support to scholars in the fields of history of science, education, medicine, and religion when they pursue further research into the place of science in nineteenth-century American higher education.[5]

[5] Other than looking at a different century, my hope aligns exactly with the goals stated in the Preface of Gleason, *Contending with Modernity: Catholic Higher Education in the Twentieth Century*.

Table 4 – Bachelor of Science and Master of Science degree-granting Catholic institutions
(in order of year B.S. degree first awarded)

Founded	Institution/City/State	Order	First B.S.	First M.S.
1851	Santa Clara University, Santa Clara, CA	Jesuit	1859	1879
1842	University of Notre Dame, Notre Dame, IN	Congregation of the Holy Cross	1865	1871
1853	Manhattan College, Bronx, NY	Christian Brothers	1868	1869
1863	La Salle College, Philadelphia, PA	Christian Brothers	1869	
1841	Fordham University, Bronx, NY	Jesuit	1871	
1863	Saint Mary's College of California, Moraga, CA	Christian Brothers	1872	
1842	Villanova University, Villanova, PA	Order of St. Augustine	1872	
1855	St. Ignatius College, San Francisco, CA	Jesuit	1875	1880
1818	Saint Louis University, St. Louis, MO	Jesuit	1878	
1830	Spring Hill College, Mobile, AL	Jesuit	1882	
1877	Las Vegas College, Las Vegas, NM	Jesuit	1882	
1821	St. Mary's College, St. Mary's, KY	Diocesan	1883	
1789	Georgetown University, Washington, DC	Jesuit	1887	1905
1863	Boston College, Chestnut Hill, MA	Jesuit	1889	
1887	Regis University, Denver, CO	Jesuit	1890	
1831	Xavier University, Cincinnati, OH	Jesuit	1890	
1858	St. Francis College, Brooklyn Heights, NY	Franciscan	1892	
1870	Loyola University Chicago, Chicago, IL	Jesuit	1895	
1852	Loyola College in Maryland, Baltimore, MD	Jesuit	1895	
1865	St. Vincent's College, Los Angeles, CA	Vincentian Fathers	1897	1899
1857	Saint John's University, Collegeville, MN	Order of St. Benedict	1899	
1873	College of Notre Dame of Maryland, Baltimore, MD	School Sisters of Notre Dame	1900	
1897	Trinity University, Washington, DC	Sisters of Notre Dame de Namur	1905	
1877	Detroit College, Detroit, MI	Jesuit	1912	
1891	Seattle University, Seattle, WA	Jesuit	1937	

Appendix 1 – Archives and Libraries Visited

I visited the below sixty-two archives and libraries over the course of my dissertation research (for a total of 130 archive-days):

Association of American Medical Colleges Archive, Washington, D.C.
Boston College, Boston, Massachusetts
Brigham Young University, Special Collections, Provo, Utah
California State Library, Sacramento, California
Catholic University of America, Washington, D.C.
Christian Brothers District Archives, Napa, California
College of Notre Dame, Baltimore, Maryland
College of the Holy Cross, Worcester, Massachusetts
Creighton University, Omaha, Nebraska
Denver Public Library, Western History Division, Denver, Colorado
Filson Historical Society, Louisville, Kentucky
Fordham University, New York City, New York
Georgetown University, Washington, D.C.
Georgetown Visitation Preparatory School, Washington, D.C.
Gonzaga University, Spokane, Washington
Jesuit Province Archives, New Orleans, Louisiana
John Carroll University, Cleveland, Ohio
Library of Congress, Washington, D.C.
Loras College, Dubuque, Iowa
Loyola College, Baltimore, Maryland
Loyola Marymount University, Los Angeles, California
Loyola University Archives, New Orleans, Louisiana
Loyola University, Chicago, Illinois
Manhattan College, New York City, New York
Marquette University Archives, Milwaukee, Wisconsin
Midwest Jesuit Archives, St. Louis, Missouri
Massachusetts Institute of Technology Archives, Cambridge, Massachusetts
Museum of the History of Science, Oxford, England
National Archives and Records Administration, Washington, D.C.
Nevada Historical Society, Reno, Nevada
New Mexico State Library, Santa Fe, New Mexico
Omaha Public Library, Omaha, Nebraska
Oregon State Library, Salem, Oregon
Regis College, Denver, Colorado
Sacred Heart National Archives, St. Louis, Missouri
Saint Mary-of-the Woods College, Terre Haute, Indiana
Salt Lake City Catholic Diocese Archives, Utah
San Francisco Archdiocese Archives, Menlo Park, California
Santa Clara University, Santa Clara, California
Sinsinawa Dominican Archives, Sinsinawa, Wisconsin
Sisters of Providence Archives, STWC, Terre Haute, Indiana
Skaneateles Historical Society, Skaneateles, New York
Smithsonian Institution, Washington, D.C.
Spring Hill College, Mobile, Alabama
St. Ambrose University, Davenport, Iowa
St. Edwards University, Austin, Texas
St. John's University, Collegeville, Minnesota
St. Louis University, St. Louis, Missouri
St. Martin's College, Lacey, Washington
St. Mary's College, Moraga, California
St. Mary's Seminary and College, Baltimore, Maryland
Stonyhurst College, England
University of California, Berkeley, California
University of Dayton, Dayton, Ohio
University of Nevada-Reno Archives, Reno, Nevada
University of Notre Dame, South Bend, Indiana
University of San Francisco, San Francisco, California
University of Scranton, Scranton, Pennsylvania
University of St. Thomas, St. Paul, Minnesota
University of the Pacific, Stockton, California
Ursuline College, Cleveland, Ohio
Xavier University, Cincinnati, Ohio

Appendix 2 – List of American Catholic Institutions of Higher Education 1789 - 1900

Institution, City, State Founded / Chartered / Closed	First: BA / BS	MA / MS	Order Comm?	Obs?	Med School?	Gender First MD
Georgetown University, Washington, DC		Jesuit				Men
1789 / 1815 /	1817 / 1887	1821 / 1905		1844	1851 /	1852
St. Mary's College, Baltimore, MD		Sulpician				Men
1791 / 1805 / 1852	1806 /	1806 /			/	
Georgetown Visitation Academy, Washington, DC		Poor Clares				Women
1799 / /	/	/			/	
Mount Saint Mary's University, Emmitsburg, MD		Diocesan				Men
1808 / 1830 /	1831 /	/			/	
St. Thomas Aquinas College, St. Rose, KY		Dominican				Men
1809 / / 1828	/	/			/	
St. Joseph's Academy for Young Ladies, Baltimore, MD		Sisters of Charity				Women
1809 / 1816 / 1902	/	/			/	
St. Joseph's College, Emmitsburg, MD		Daughters of Charity of St. Vincent de Paul				Men
1809 / 1902 / 1973	/	/			/	
New York Literary Institute, New York, NY		Jesuit				Men
1809 / / 1813	/	/			/	
Loretto Academy, Hardins Creek, Marion County, KY		Sisters of Loretto				Women
1812 / 1829 /	/	/			/	
Ursuline Convent, New York City, NY		Ursulines				Women
1812 / 1814 / 1815	/	/			/	
Saint Louis University, St. Louis, MO		Jesuit				Men
1818 / 1832 /	1834 / 1878	1834 /	1832	1860	1836 /	1839
St. Joseph's College, Bardstown, KY		Jesuit				Men
1819 / 1824 / 1889	/	1852 /		1841	/	
St. Mary's College, Barrens, Perry County, MO		Vincentian Fathers				Men
1819 / 1823 / 1863	/	/			/	
Gonzaga College, Washington, DC		Jesuit				Men
1821 / 1858 /	1868 /	/			/	
St. Mary's College, St. Mary's, KY		Diocesan				Men
1821 / 1837 / 1976	1876 / 1883	1886 /	1874		/	
Charleston Philosophical and Seminary, Charleston, SC						Men
1822 / 1823 / 1830	/	/			/	
Mallinckrodt College, Wilmette, IL		Sisters of Christian Charity				Women
1825 / /	/	/			/	
Mount Benedict, Charlestown, MA		Ursulines				Women
1828 / / 1843	/	/			/	

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm?	Obs?	Med School?	Gender First MD
St. John's Literary Institute, Frederick City, MD		Jesuit				Men
1828 / 1850 / 1860	/	/ /			/	
Poydras College, Pointe Coupee, LA		Diocesan				Men
1829 / 1854 / 1861	/	/ /			/	
Spring Hill College, Mobile, AL		Jesuit				Men
1830 / 1835 /	1837 / 1882	/ 1851 /	1850		/	
Rock Hill College, Ellicott City, MD		Christian Brothers				Men
1830 / /	/	/ /			/	
Jefferson College, Convent, LA		Marist				Men
1831 / / 1855	/	/ /			/	
Xavier University, Cincinnati, OH		Jesuit				Men
1831 / 1842 /	1843 / 1890	/ 1842 /	1841		/	
Laurel Hill College, Philadelphia, PA		Jesuit				Men
1835 / 1835 / 1836	/	/ /			/	
St. Gabriel's College, Vincennes, IN		Diocesan/Eudist Fathers				Men
1836 / 1841 / 1846	/	/ /			/	
St. Philip Neri College, Detroit, MI		Diocesan				Men
1836 / 1839 / 1842	/	/ /			/	
St. Charles College, Grand Coteau, LA		Jesuit				Men
1837 / 1852 / 1922	/	/ /			/	
St. Mary's College, Wilmington, DE		Diocesan				Men
1839 / 1847 / 1868	/	/ /			/	
St. Joseph's College, Dubuque, IA		Diocesan				Men
1839 / 1894 /	1895 /	/ 1899 /			/	
Saint Mary of the Woods College, Terre Haute, IN		Sisters of Providence				Women
1840 / 1846 /	1899 /	/ /			/	
Fordham University, Bronx, NY		Jesuit				Men
1841 / 1846 /	1846 / 1871	/ /	1852		/	1909
St. Vincent's College, Richmond, VA						Men
1841 / / 1846	/	/ /			/	
University of Notre Dame, Notre Dame, IN		Congregation of the Holy Cross				Men
1842 / 1844 /	1849 / 1865	/ 1859 / 1871	1867		1854 /	
Villanova University, Villanova, PA		Order of St. Augustine				Men
1842 / 1848 /	1855 / 1872	/ /	1870		/	
Clarke College, Dubuque, IA		Sisters of Charity				Women
1843 / 1910 /	/	/ /			/	

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm?	Obs?	Med School?	Gender First MD
College of the Holy Cross, Worcester, MA		Jesuit				Men
1843 / 1865 /	1849 /	/ 1856			/	
St. Joseph's College, Willamette, OR		Diocesan				Men
1843 / 1852 / 1852	/	/			/	
College of our Lady of Refuge of Sinners, Solvang, CA						Men
1844 / / 1846	/	/			/	
University of St. Mary's of the Lake, Chicago, IL		Diocesan				Men
1844 / 1844 / 1866	/	/			1864 /	
Saint Mary's College, Notre Dame, IN		Sisters of the Holy Cross				Women
1844 / 1855 /	1899 /	/			/	
St. Vincent's College, Cape Girardeau, MO		Lazarist				Men
1844 / /	/	/			/	
Saint Xavier University, Chicago, IL		Sisters of Mercy				Women
1846 / 1847 /	/	/			/	
Marygrove College, Detroit, MI		Servants of the Immaculate Heart of Mary				Women
1846 / / 2019	/	/			/	
Saint Vincent College, Latrobe, PA		Order of St. Benedict				Men
1846 / 1870 /	1871 /	/ 1873 /			/	
St. Dominic's College, Sinsinawa, WI		Dominican				Men
1846 / 1848 / 1864	/	/			/	
Immaculate Conception College, New Orleans, LA		Jesuit				Men
1847 / 1856 /	1856 /	/ 1876			/	
St. Francis Xavier College, New York, NY		Jesuit				Men
1847 / 1861 / 1912	1861 /	/ 1850			/	
College of Mount Saint Vincent, Riverdale, NY		Sisters of Charity				Women
1847 / 1911 /	/	/			/	
Saint Francis University, Loretto, PA		Franciscan				Men
1847 / 1858 /	/	/			/	
St. Andrew's College, Fort Smith, AR		Diocesan				Men
1848 / 1849 / 1860	/	/			/	
St. Mary's College, St. Mary's, KS		Jesuit				Men
1848 / 1869 / 1931	1882 /	/ 1875		1899	/	
St. Charles College, Ellicott City, MD		Sulpician				Men
1848 / / 1911	/	/			/	
Sacred Heart College, Rochester, NY		Diocesan				Men
1848 / 1849 /	/	/			/	

Institution, City, State Founded / Chartered / Closed	First: BA	/ BS	/ MA	/ MS	Comm?	Obs?	Med School?	Order / Gender / First MD
St. Clara's College, Benton, WI								Dominican Sisters / Women
1848 / 1852 / 1922	/	/	/					/
St. Aloysius College, Louisville, KY								Jesuit / Men
1849 / 1851 / 1857	/	/	/					/
Saints Peter and Paul College, Baton Rouge, LA								Jesuit / Men
1849 / 1853 / 1865	/	/	/					/
St. Joseph's College, Buffalo, NY								Christian Brothers / Men
1849 / 1861 /	/	/	/					/
Calvert College, New Windsor, MD								Lay / Men
1850 / 1852 / 1876	/	/	/					/
Ursuline College, Cleveland, OH								Ursulines / Women
1850 / 1871 /	1872	/	/	/				/
University of Dayton, Dayton, OH								Society of Mary / Men
1850 / 1882 /	/	/	/					/
St. Mary's College, Charleston, SC								Diocesan / Men
1850 / 1853 /	/	/	/					/
Notre Dame de Namur University, Belmont, CA								Sisters of Notre Dame de Namur / Women
1851 / 1868 /	/	/	/					/
Santa Clara University, Santa Clara, CA								Jesuit / Men
1851 / 1855 /	1857	/ 1859	/ 1859	/ 1879	1855	1895		/
Marian College, Indianapolis, IN								Sisters of St. Francis / Men
1851 / /	/	/	/					/
Gethsemani College, Gethsemani, KY								Men
1851 / /	/	/	/					/
Christian Brothers College, St. Louis, MO								Christian Brothers / Men
1851 / 1855 /	/	/	/					/
Saint Joseph's University, Philadelphia, PA								Jesuit / Men
1851 / 1852 /	1858	/	/	/	1852			/
St. Mary's College, Columbia, SC								Men
1851 / / 1865	/	/	/					/
Mission Dolores College, San Jose, CA								Jesuit / Men
1852 / 1854 /	/	/	/					/
Loyola College in Maryland, Baltimore, MD								Jesuit / Men
1852 / 1853 /	1853	/ 1895	/ 1853	/	1877			/
St. Mary's College, Natchez, MS								Brothers of Sacred Heart / Men
1852 / /	/	/	/					/

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm? Obs? Med School?	Gender First MD
St. Mary's University, San Antonio, TX 1852 / /	/ /	Society of Mary /		Men /
Manhattan College, Bronx, NY 1853 / 1863 /	1866 / 1868	Christian Brothers 1866 / 1869	1864	Men /
Mount Aloysius College, Cresson, PA 1853 / 1991 /	/ /	Religious Sisters of Mercy /		Men /
St. Meinrad's College, St. Meinrad, IN 1854 / /	/ /	Order of St. Benedict /		Men /
St. Stanislaus College, Bay St. Louis, MS 1854 / 1870 /	/ /	Brothers of Sacred Heart /		Men /
St. John's College, Cleveland, OH 1854 / /	/ /	Diocesan /		Men /
Immaculate Conception College, Galveston, TX 1854 / 1855 / 1924	/ /	Jesuit?/Oblates of Mary Immaculate /		Men /
St. Ignatius College, San Francisco, CA 1855 / 1859 /	1863 / 1875	Jesuit 1867 / 1880		Men /
St. Peter's College, Chillicothe, IL 1855 / / 1856	/ /	Diocesan /		Men /
Immaculate Conception College, Iberville, LA 1855 / 1856 / 1857	/ /	Diocesan /		Men /
St. Stanislaus Preparatory College, White Sulphur, KY 1856 / / 1861	/ /	Diocesan /		Men /
St. Joseph's College, Natchitoches, MS 1856 / / 1863	/ /	Diocesan /		Men /
Seton Hall University, South Orange, NJ 1856 / 1861 /	/ /	Diocesan /		Men /
Niagara University, Niagara University, NY 1856 / 1863 /	/ /	Vincentian Fathers /		Men /
Mt. St. Mary's College, Cincinnati, OH 1856 / 1856 /	/ /	Diocesan /		Men /
St. James College, Vancouver, WA 1856 / /	/ /	/		Men /
St. Francis De Sales College, St. Francis, WI 1856 / 1865 /	/ /	/		Men /
Saint John's University, Collegeville, MN 1857 / 1869 /	1870 / 1899	Order of St. Benedict 1870 /	1873 1890	Men /

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm?	Obs?	Med School?	Gender First MD
Marquette University, Milwaukee, WI		Jesuit				Men
1857 / 1864 /	1887 /	1889 /	1882		1907 /	1908
University of Saint Mary, Leavenworth, KS		Sisters of Charity				Women
1858 / 1923 /	/	/			/	
St. Francis College, Brooklyn Heights, NY		Franciscan				Men
1858 / 1884 /	1884 / 1892	/			/	
St. Bonaventure University, Saint Bonaventure, NY		Franciscan				Men
1858 / 1875 /	/	/			/	
St. Peter's College, Troy, NY		Diocesan				Men
1858 / / 1859	/	/			/	
Benedictine College, Atchison, KS		Order of St. Benedict				Men
1859 / 1868 /	/	/			/	
College of Santa Fe, Santa Fe, NM		Christian Brothers				Men
1859 / 1874 /	/	/			/	
Syracuse Catholic College, Syracuse, NY		Diocesan				Men
1859 / /	/	/			/	
Quincy University, Quincy, IL		Franciscan				Men
1860 / 1873 /	/	/			/	
Cecil College, Elizabethtown, KY		Lay				Men
1860 / 1867 /	/	/			/	
Borromeo College, Pikesville, MD		Diocesan				Men
1860 / / 1872	/	/			/	
College of Saint Elizabeth, Morristown, NJ		Sisters of Charity				Women
1860 / 1899 /	1903 /	/			/	
St. Joseph's College, Teutopolis, IL		Franciscan				Men
1862 / 1881 /	/	/			/	
Saint Mary's College of California, Moraga, CA		Christian Brothers				Men
1863 / 1872 /	1873 / 1872	/ 1872 /	1872		/	
Mount St. Scholastica College, Atchison, KS		Order of St. Benedict				Women
1863 / 1934 /	/	/			/	
Boston College, Chestnut Hill, MA		Jesuit				Men
1863 / 1863 /	1872 / 1889	/ 1877 /		1890	/	
La Salle College, Philadelphia, PA		Christian Brothers				Men
1863 / 1863 /	1871 / 1869	/			/	
St. Xavier's Institute, Louisville, KY		Xaverian Brothers				Men
1864 / 1872 /	/	/			/	

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm?	Obs?	Med School?	Gender First MD
St. Vincent's College, Los Angeles, CA		Vincentian Fathers				Men
1865 / 1869 / 1911	1887 / 1897	1894 / 1899	1881		/	
St. Viateur's College, Bourbonnais, IL		Viatorian				Men
1865 / 1874 / 1939	/	/			/	
St. Joseph's College, St. Joseph, MO		Christian Brothers				Men
1865 / /	/	/			/	
Meadville College, Meadville, PA		Diocesan				Men
1865 / /	/	/			/	
St. Vincent's College, Wheeling, WV		Diocesan				Men
1865 / /	/	/			/	
Natchez College, Natchez, MS						Men
1866 / / 1869	/	/			/	
Pass Christian College, Pass Christian, MS		Christian Brothers				Men
1866 / 1866 / 1875	/	/			/	
St. Joseph's College, Rhinecliff, NY						Men
1866 / /	/	/			/	
St. Louis College, Louisville, OH		Diocesan				Men
1866 / / 1869	/	/			/	
Holy Angel's College, Vancouver, WA		Diocesan				Men
1866 / /	/	/			/	
Holy Names University, Oakland, CA		Sisters of the Holy Names of Jesus and Mary				Women
1868 / /	/	/			/	
Franciscan College, Santa Barbara, CA						Men
1868 / / 1879	/	/			/	
College and Seminary of the Assumption, Topeka, KS						Men
1868 / / 1872	/	/			/	
St. Benedict's College, Newark, NJ						Men
1868 / / 1906	/	/			/	
Woodstock College, Woodstock, MD		Jesuit				Men
1869 / / 1971	/	/		1890	/	
St. Louis College, New York, NY						Men
1869 / / 1888	/	/			/	
St. Joseph's College, Brownsville, TX		Diocesan/Christian Brothers/Oblate Fathers				Men
1869 / / 1923	/	/			/	
Loyola University Chicago, Chicago, IL		Jesuit				Men
1870 / /	1876 / 1895	1873 /	1879		/	

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm? Obs? Med School?	Gender First MD
College of the Sacred Heart of Jesus, Ruma, IL 1870 / / 1877	/ /	Diocesan / /	/	Men
College of St. Francis, Neosho County, KS 1870 / 1870 / 1891	/ /	/ /	1870 /	Men
Canisius College, Buffalo, NY 1870 / 1883 /	/ /	Jesuit / /	/	Men
Saint John's University, Jamaica, NY 1870 / /	/ /	Vincentian Fathers / /	/	Men
St. Joseph's College, Rohnerville, CA 1871 / / 1877	/ /	Society of Precious Blood / /	/	Men
St. Joseph's College, Cincinnati, OH 1871 / 1873 / 1921	1874 / /	Congregation of the Holy Cross / /	1873 /	Men
St. Michael's College, Portland, OR 1871 / / 1895	/ /	Christian Brothers / /	/	Men
Christian Brothers University, Memphis, TN 1871 / 1872 /	1875 / /	Christian Brothers 1875 / /	1876 /	Men
Ecclesiastical College of St. Lawrence, Calvary, WI 1871 / / 1892	/ /	Order of Friars Minor Capuchin / /	/	Men
St. John's College, Prairie du Chien, WI 1871 / / 1880	/ /	Christain Brothers / /	/	Men
Pio Nono College, St. Francis, WI 1871 / 1872 /	/ /	/ /	/	Men
St. Bonaventure College, Terre Haute, IN 1872 / / 1888	/ /	Order of Merciful Christ / /	/	Men
St. Mary's College, New Orleans, LA 1872 / / 1879	/ /	Christian Brothers / /	/	Men
Saint Peter's College, Jersey City, NJ 1872 / 1878 /	/ /	Jesuit / /	/	Men
College of Our Lady of the Sacred Heart, Watertown, WI 1872 / 1874 / 1887	/ /	Brothers of the Holy Cross / /	/	Men
College of Notre Dame of Maryland, Baltimore, MD 1873 / 1896 /	1899 / 1900 /	School Sisters of Notre Dame / /	/	Women
Sacred Heart College, San Francisco, CA 1874 / 1875 / 1929	/ /	Christian Brothers / /	/	Men
Pio Nono College, Macon, GA 1874 / 1875 / 1888	/ /	Diocesan / /	/	Men

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm? Obs? Med School?	Gender First MD
Germantown Day College, Germantown, PA 1874 / / 1883	/ /	Vincentian Fathers /	/	Men
Mt. Saint Joseph Teachers College, Buffalo, NY 1875 / 1937 /	/ /	Sisters of St. Joseph /	/	Women
St. Joseph's College, Cleveland, OH 1875 / 1878 / 1879	/ /	Franciscan /	/	Men
St. Gregory's University, Shawnee, OK 1875 / /	/ /	Order of St. Benedict /	/	Men
St. Mary's Academy, Salt Lake City, UT 1875 / / 1969	/ /	Sisters of the Holy Cross /	/	Women
Queen of the Holy Rosary College, Mission San Jose, CA 1876 / /	/ /	Dominican Sisters /	/	Women
Christian Brothers College, Sacramento, CA 1876 / / 1924	/ /	Christian Brothers /	/	Men
St. Joseph's College, Denver, CO 1876 / / 1881	/ /	/	/	Men
Mt. Carmel College, Scipio, KS 1876 / / 1884	/ /	/	/	Men
Mt. St. Joseph's College, Baltimore, MD 1876 / 1876 / 1915	/ /	/ 1876	/	Men
College of St. Ignatius, Mankato, MN 1876 / / 1879	/ /	Jesuit /	/	Men
Belmont Abbey College, Belmont, NC 1876 / /	/ /	Order of St. Benedict /	/	Men
St. Patrick's College, Walla Walla, WA 1876 / / 1890	/ /	/	/	Men
Detroit College, Detroit, MI 1877 / 1881 / 1883	/ 1912 /	Jesuit /	/	Men
Las Vegas College, Las Vegas, NM 1877 / / 1887	/ 1882 /	Jesuit /	/	Men
New Subiaco College, Subiaco, AR 1878 / 1881 / 1930	/ /	/	/	Men
Creighton University, Omaha, NE 1878 / 1879 / 1891	/ /	Jesuit 1893 /	1885 1892 /	Men 1893
Duquesne University, Pittsburgh, PA 1878 / /	/ /	Holy Ghost /	/	Men

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm? Obs? Med School?	Gender First MD
Guadalupe College, Seguin, TX 1878 / / 1890	/ /	Jesuit /	/	Men
St. Joseph's College, Victoria, TX 1880 / / 1920	/ /	Diocesan /	/	Men
Campion College of the Sacred Heart, Prairie du Chien, WI 1880 / / 1888	/ /	Jesuit /	1880 1883 /	Men
Duchesne College of the Sacred Heart, Omaha, NE 1881 / / 1968	/ /	Religious of the Sacred Heart of Jesus /	/	Women
Saint Edward's University, Austin, TX 1881 / 1885 / 1896	/ /	Congregation of the Holy Cross /	1886 /	Men
University of the Incarnate Word, San Antonio, TX 1881 / 1881 /	/ /	Sisters of Charity of the Incarnate Word /	/	Women
St. Ambrose University, Davenport, IA 1882 / 1885 / 1889	/ /	Diocesan /	1882 /	Men
St. Mary's Commercial College, New Orleans, LA 1882 / / 1889	/ /	Christian Brothers /	/	Men
St. Thomas Aquinas College, Cambridgeport, MA 1882 / / 1917	/ /	Diocesan /	/	Men
St. Ignatius College, Pend'dOreilles Mission, MT 1882 / / 1889	/ /	Jesuit /	/	Men
Thibodaux College, Thibodaux, LA 1883 / / 1896	/ /	Diocesan /	/	Men
Conception College, Conception, MO 1883 / 1887 / 1932	/ /	Order of St. Benedict /	1883 /	Men
Seton Hill University, Greensburg, PA 1883 / /	/ /	Sisters of Charity /	/	Women
St. Joseph's College, San Jose, CA 1884 / 1885 / 1896	/ /	Jesuit /	/	Men
St. Mary's College, Stockton, CA 1884 / / 1892	/ /	/	/	Men
Sacred Heart College, Morrison, CO 1884 / / 1888	/ /	Jesuit /	/	Men
St. Aloysius College, Helena, MT 1884 / 1886 / 1904	/ /	Diocesan /	/	Men
College of the Sacred Heart, Vineland, NJ 1884 / / 1900	/ /	Father's of Mercy /	/	Men

Institution, City, State Founded / Chartered / Closed	First: BA / BS	MA / MS	Order Comm?	Obs?	Med School?	Gender First MD
Aquinas College, Columbus, OH		Order of Friars Preachers				Men
1884 / 1884 / 1927	/	/ /			/	
St. Joseph's College, Burlington, VT		Diocesan				Men
1884 / / 1892	/	/ /	1884		/	
St. Mary's College, Orchard Lake, MI						Men
1885 / 1927 /	/	/ /			/	
University of St. Thomas, St. Paul, MN		Diocesan				Men
1885 / 1894 /	/	/ /	1893		/	
Aquinas College, Grand Rapids, MI		Dominican				Men
1886 / /	/	/ /			/	
John Carroll University, Cleveland, OH		Jesuit				Men
1886 / 1890 /	/	/ /	1886	1896	/	
St. Mary's College, Portland, OR		Christian Brothers				Men
1886 / / 1910	/	/ /			/	
Regis University, Denver, CO		Jesuit				Men
1887 / 1889 /	1890 / 1890	/ 1891 /	1887		/	
St. John's College, Washington, DC		Christian Brothers				Men
1887 / / 1921	/	/ /			/	
Benedictine University, Lisle, IL		Benedictine Monks of St. Procopius				Men
1887 / 1890 /	/	/ /			/	
Van Buren College, Van Buren, ME		Society of Mary				Men
1887 / 1889 / 1917	/	/ /			/	
College of Saint Benedict, St. Joseph, MN		Benedictine Sisters of St. Cloud				Women
1887 / /	/	/ /			/	
Mt. Angel College, St. Benedict, OR		Order of St. Benedict				Men
1887 / 1887 / 1948	/	/ /			/	
Gonzaga University, Spokane, WA		Jesuit				Men
1887 / 1892 /	1894 /	/ 1897 /	1887		/	
Alverno College, Milwaukee, WI		Sisters of St. Francis				Women
1887 / 1890 /	/	/ /			/	
University of Scanton, Scanton, PA		Diocesan/Christian Brothers				Men
1888 / 1924 /	/	/ /	1892		/	
All Hallow's College, Salt Lake City, UT		Diocesan				Men
1888 / 1890 / 1914	/	/ /			/	
The Catholic University of America, Washington, DC		Pontifical				Men
1889 / /	1898 /	/ /		1891	/	

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm? Obs? Med School?	Gender First MD
Saint Leo University, St. Leo, FL 1889 / 1891 /	/ /	Independent /	/	Men
St. Stanislaus College, Chicago, IL 1889 / 1890 / 1913	/ /	Congregation of the Resurrection /	/	Men
Jasper College, Jasper, IN 1889 / / 1904	/ /	Order of St. Benedict / 1889	/	Men
Saint Joseph's College, Rensselaer, IN 1889 / 1891 /	/ /	The Society of the Precious Blood /	/	Men
Nazareth College, Kalamazoo, MI 1889 / / 1992	/ /	Sisters of St. Joseph /	/	Women
Saint Anselm College , Manchester, NH 1889 / 1895 /	/ /	Order of St. Benedict /	/	Men
St. Bede College, La Salle, IL 1890 / 1890 / 1967	/ /	Order of St. Benedict /	/	Men
University of Saint Francis, Fort Wayne, IN 1890 / 1890 /	/ /	Sisters of St. Francis /	/	Men
Holy Cross College, New Orleans, LA 1890 / / 1915	/ /	Congregation of the Holy Cross /	/	Men
Epiphany Apostolistic College, Walbrook, MD 1890 / / 1894	/ /	Josephites /	/	Men
Viterbo University, La Crosse, WI 1890 / 1939 /	/ /	Sisters of St. Francis /	/	Women
Loretto Heights College, Denver, CO 1891 / / 1988	/ /	Sisters of Loretto /	/	Women
Saint Joseph Seminary College, Covington, LA 1891 / 1903 /	/ /	Benedictine Monks of St. Joseph Abbey /	/	Men
St. Louis College, San Antonio, TX 1891 / /	/ /	Society of Mary /	/	Men
Seattle University, Seattle, WA 1891 / 1898 /	1909 / 1937 /	Jesuit /	/	Men
Caritas Laboure College, Boston, MA 1892 / / 1997	/ /	Daughters of Charity of St. Vincent de Paul /	/	Women
St. Joseph's Commercial College, Detroit, MI 1892 / / 1912	/ /	Christian Brothers / 1892	/	Men
Sacred Heart College, Belmont, NC 1892 / / 1988	/ /	Sisters of Mercy /	/	Women

Institution, City, State Founded / Chartered / Closed	First: BA / BS	Order MA / MS	Comm? Obs? Med School?	Gender First MD
Sacred Heart College, Sacred Heart, OK 1892 / / 1901	/ /	/	/	Men
Southern Benedictine College, Cullman, AL 1893 / / 1979	/ /	Sisters of Cullman /	/	Men
Marylhurst University, Marylhurst, OR 1893 / /	/ /	Sisters of the Holy Names of Jesus and Mary /	/	Women
St. Francis Xavier College, Alexandria, LA 1894 / / 1900	/ /	Order of St. Benedict /	/	Men
St. Joseph's College, Lowell, MA 1894 / / 1902	/ /	Little Brothers of Mary /	/	Men
St. Joseph's College, Springfield, MO 1894 / / 1898	/ /	Order of St. Benedict /	/	Men
Our Lady of the Lake University, San Antonio, TX 1895 / 1911 /	/ /	Sisters of Divine Providence--San Antonio /	/	Women
Saint Martin's University, Lacey, WA 1895 / 1938 /	/ /	Order of St. Benedict /	1895 /	Men
Holy Angel's College, Buffalo, NY 1896 / 1898 /	/ /	Oblates of Mary Immaculate /	1986 /	Men
Institute of Our Lady of Lourdes, Seattle, WA 1896 / / 1904	/ /	Brothers of Our Lady of Lourdes /	/	Men
Trinity University, Washington, DC 1897 / / 1904	/ 1905 /	Sisters of Notre Dame de Namur 1905 /	/	Women
College of New Rochelle, New Rochelle, NY 1897 / 1904 / 2019	/ /	Ursulines /	/	Women
Lone Mountain College, Menlo Park/San Francisco, CA 1898 / / 1978	/ /	Sisters of the Immaculate Heart of Mary /	/	Women
DePaul University, Chicago, IL 1898 / 1898 /	/ /	Vincentian Fathers /	/	Men
St. Gall's College, Devil's Lake, ND 1898 / / 1904	/ /	Order of St. Benedict /	/	Men
St. John's College, Toledo, OH 1898 / 1900 / 1936	/ /	Jesuit /	/	Men
Saint Norbert College, De Pere, WI 1898 / 1898 /	/ /	Norbertine Fathers, Premonstratensian Order /	/	Men
St. Joseph's College for Negro Catechists, Montgomery, AL 1899 / / 1920	/ /	/	/	Men

Institution, City, State Founded / Chartered / Closed	First: BA / BS / MA / MS	Order Comm? Obs?	Med School? /	Gender First MD
College of Our Lady of the Elms, Chicopee, MA 1899 / 1928 /	/ / /	Sisters of St. Joseph of Springfield	/	Women
St. Mary's College, Richardton, ND 1899 / 1903 /	/ / /	Order of St. Benedict	/	Men

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