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Dual Vocations of Science and Religion: A Historical Case Study of Benedictine Women

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Abstract: This study examines Catholic Benedictine sisters who majored in sciences and taught science for over 100 years at the College of St. Benedict in St. Joseph, MN. In 1913, the College of St. Benedict began as a women's college, expanding St. Benedict's Academy, a boarding high school for women. This historical organizational case study analyzed archived data to understand the benefits and challenges of women who lived religious lives and studied science. While women, in general, are still underrepresented in the sciences, the data collected provides information on how the sisters obtained advanced degrees as early as 1923, well before women were widely accepted in the sciences in colleges. Over time, the need for training scientists declined as the number of women in the community declined. The academic cooperation with the male college, St. John's University, allowed coeducational courses, merging departments and decreasing the need for faculty. The demand for teachers in K-12 schools also fell as choices increased for public education and some Catholic high schools closed. The sisters, however, contributed to scientific research and collaborated with scientists worldwide while living religious lives, despite the long duration of academic studies. In addition, they were pioneers in developing science curricula at all levels and served in many leadership roles both at the college and in the monastery. The lasting legacy of the sisters in science continues, as 1800 lay women have graduated with degrees in the sciences since the start of college.

Keywords: underrepresented, women in science, monastic, Benedictine

Introduction

If you ask someone to describe or draw a scientist, they will most likely describe or draw a male in a white lab coat. It would be very unlikely to hear a description or see a drawing woman in a religious habit. A widespread perception exists that scientists are male and there is no place for women in science (Hall 2010). Some blame marriage and family as a barrier, while others claim the homophobic network of men, referred to as the "boys club," has made it difficult for women to progress in this field (White, Vinuesa, Sahajwalla, and Terkes 2015). In a literature review conducted by the National Science Foundation found several studies that gender limited career advancement in science, were marginalized and excluded from significant roles in departments and reaching tenure because of interruptions in careers from childbearing (National Science Foundation, 2003). One other attitude that persisted early on was the intellectual ability of women. As late as 2005, the former president of Harvard viewed women as not having the innate ability for science (Hall 2010). The exclusion of women in science traces back to the 18th Century (Hall 2010). Some progress has been made increasing the number of women in science, yet even with bold efforts to recruit, retain, and promote women in science, women, in general, are underrepresented. Approximately 30% of research scientists are women worldwide (White,

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Vinuesa, Sahajwalla, and Terkes 2015). The number of women in science in religious communities may not even be represented in this number.

Recently, we have begun to hear about some of the significant contributions in science from women from the past and acknowledge their research today. However, the role of women scientists in American culture and society has not been well documented (Zanish-Belcher 2012), including women in religious communities. Most historians have ignored the contributions of religious women in science and have only highlighted the contributions of men in the Catholic church (Collins 2009). Early records show that the science curriculum did not exist for women in earlier years, both Catholic and non-Catholic, emphasizing "domestic subjects" (Collins 2009, 654). As time went on with a shift to women in the workforce, women began to have more opportunities beyond high school; however, those pursuing science often had no children or had someone who shared family responsibilities (Hall 2010).

Beyond high school, college education was limited for Catholic women. The church frowned on Catholic women attending "non-Catholic" colleges, and women were not allowed to participate in coeducational schooling beyond grade school. What is of particular interest, however, are women who joined the religious order and studied science, a profession with significant barriers for women. Perhaps success in science early on was attributed to this choice of religious life. Examining the professional lives of women science teachers, one could argue that the choice of a religious vocation also enabled sisters to enjoy autonomy as professional educators, not generally available outside the convent walls (Collins 2009). However, studying science in a male-dominated field was even more of a challenge for Catholic sisters who also had to navigate the patriarchal systems of the Catholic Church (Ryan 2019). The church (the bishop) had the ultimate control of where the sisters who joined the order could attend college and obtain advanced degrees.

This article examines archival sources to explore the experiences of the sisters who studied science from 1913 to the present at St. Benedict's Monastery to understand more about how the sisters navigated dual vocations of religion and science.

Background

In 1913, the community of the Benedictine sisters in St. Joseph, MN, founded the College of St. Benedict. This large community of sisters peaking at over 1200 members (Adkins 2013), had a significant role in education. The sisters

followed The Rule of Saint Benedict, the foundational document on how to lead a Benedictine monastic life (Fry et al. 1981). Monasticism was a"school" for those in the religious life and inspired their work for how they established other educational programs in and for wisdom (Frigge 2003). Education and educating women was not new to the sisters, staffing parish and boarding schools. It established St. Benedict's Academy in 1883, a boarding "finishing" high school for women. The boarding school maintained a strict schedule similar to convent life, with attending mass, prayers, and taking classes. After finishing boarding school, many of the women joined the convent and were given the assignment of teaching. The women's religious communities or sister teachers made up the bulk of the Catholic teaching force in the United States in the early 20th century, with estimates of over 50,000 sisters teaching before 1920 (Atkins 2013, Ryan 2019).

Science was integral in the education curriculum, including St. Benedict's Academy. The course catalog lists science in later grades. The women learned science from a text, "First Lessons in Natural Philosophy" by Dr. Joseph Martindale, which covered topics of light, heat, air, and water in a question-and-answer format (Martindale 1881). Science also became a part of the college curriculum. From the college's founding, the College of Saint Benedict offered vocation-specific courses in home economics (later dietetics and nutrition), teaching, and business to help women in different professions. While few of the sisters had experience with higher education, they moved quickly to obtain degrees to be one step ahead of the students. In earlier times, sisters taught grade school with very little education. As time passed, a high school diploma was required to teach grade school and two years of college to teach high school. However, the faculty needed college degrees to staff a college, which was a challenge for a Catholic woman who lived in a religious community. Without the help of Bishop John Ireland, this may not have been possible. He advocated and founded a summer school for Catholic sisters at the Catholic University in 1911 (Atkins 2013).

As the women established the college, the sisters played multiple roles throughout the year, teaching lay students during the school year and teaching sisters and teachers during the summer while maintaining their religious obligations. From 1913 to the present, forty sisters at St. Benedict's Monastery obtained degrees in the sciences (biology, chemistry, and physics), a field where women are still underrepresented. The sisters navigated a religious life along with teaching science. This number does not include a few women who studied science and left the community or religious women from other monasteries who came to the college to study science. This article presents

data to address the following question: What benefits and challenges existed for the sisters in the monastery to pursue science degrees?

Method

Data Collection

A historical organizational case study was the methodology used to examine the monastic women who studied science. This study traced the sisters who taught science and studied science from the start of the College of St. Benedict in 1913 to the present day. A historical organizational case study concentrates on a particular organization over time, tracing its history and the organization's development (Bogdan and Bilken 2007). Archived data from the Sisters of Order of Saint Benedict and the College of Saint Benedict was retrieved in St. Joseph, Minnesota. The data was collected in two phases, one for the deceased sisters and the second for those still living. In the first phase, after the sisters who studied science were identified, and data was retrieved from the archives. The researcher decided not to include other majors related to the sciences, such as dietetics, nutrition, and nursing, to narrow the data set. Data retrieved included oral histories, personal data records, college records, obituaries, autobiographies, registration records, publications, and other registered artifacts. As the artifacts were analyzed, field notes were recorded. In the second phase, interviews were conducted with the three living sisters using open-ended questions. Consent was given before the interview.

Data Analysis

After collecting the data sources, the constant comparative coding method (Bogdan and Bilken 2007) was used to determine themes that emerged from the data (Corbin and Strauss 2008). Recurring words and phrases from archived data were noted and sorted into categories based on similarities. For instance, several codes were based on terms the sisters used in oral history and interviews, including obedience, college challenges, assignment changes, scholarship opportunities, and leadership, and noting comparisons and connections in the data.

Findings

College Challenges and Obedience

In 1913, when the College of St. Benedict began, opportunities for Catholic women to continue education after high school was limited. It became a natural progression for the sisters to start a college to provide an opportunity

for advancement in education for Catholic women beyond St. Benedict's Academy. Women's colleges were being established in a growing number to give women access to college. Between 1905 and 1915, 14 Catholic women's colleges were opened in the United States (Atkins 2013, 32).

For the sisters at the College of St. Benedict, starting the college required the sisters to obtain college degrees. The sisters who taught science at the college had experience teaching in K-12 classrooms but needed more advanced degrees. Many were sent on their first mission to teach with nothing more than a high school degree. Attending college was a significant challenge because the sisters were not allowed to attend non-Catholic institutions or institutions with men in the beginning. Bishop Ireland changed this in 1911, founding a summer school for Catholic sisters. Many sisters began by taking classes at the Catholic University's Sisters College in Washington, D.C. to start and then branched to the University of Minnesota and Loras College (Atkins 2013, 34) for more specific training. Some sisters took classes in the summer, and some received credits by independent studying and taking professional exams. The sisters accumulated credits slowly over the summers to obtain their degrees because, during the regular academic year, they had obligations to teach either at the college or in K-12 schools. As time progressed and advanced degrees were obtained, the sisters started taking courses at the University of Minnesota, Notre Dame, or Marquette University. To meet the needs of the college and accreditation, this was required. It was not a personal choice or interest that allowed a sister to get an advanced degree. You had to be lucky enough for the prioress to see your potential and decide that you were the one going back to school to get the advanced degree.

While no exact archived data reveals how one of the earliest college science faculty at the College of St. Benedict, Sister (S.) Magna Werth obtained her degree; she was the first science faculty added in 1915 to teach chemistry and physics after teaching twelve years of grades five through twelve. One archived record indicates she received her bachelor's degree in philosophy and minor in education from Saint John's University; however, the records show the majority of the credits were from the Catholic University and Columbia College.

The first woman to obtain her bachelor's degree in science (botany) at the College of St. Benedict was S. Remberta Westkaemper in 1919. She opened the biology department and started teaching in 1917, after teaching for ten years in grades fourth to eighth. S. Remberta Westkaemper would later complete her doctorate at the University of Minnesota in 1929. She taught in the college for 40 years and served as the first full-time college president.

Before S. Remberta served as president in 1957, Mother Richarda Peters the Prioress served both roles. In 1961 at the end of S. Remberta's presidency, the Benedictine community incorporated the College for financial reasons. The incorporation did not change the relationship between the monastic community and the college at first, but lay faculty were hired more regularly as enrollment increased.

S. Marie Hilger was the first sister to obtain her degree in chemistry at the University of Minnesota in 1923. Strangely, she obtained her bachelor's and master's degree in the same year. It was not uncommon to accumulate credits elsewhere, but the degree was conferred at the final institution of study. She would spend 40 years of her career as a chemistry teacher at the College of Saint Benedict and secondary schools in St. Joseph, Bismarck, Altoona, Cold Spring, and St. Cloud. The first chemistry degree award at the College of St. Benedict was to S. Bernice Knelleken in 1923. S. Bernice served as a high school science teacher and principal for over 60 years. Like S. Remberta, most sisters completed post-graduate work at the University of Minnesota, Loras College, Catholic University, and a master's degree at the University of Marquette. Other early sciences teachers at the College of Saint Benedict included S. Magloire Kiloran. S. Magloire obtained her degree in biology in 1926 and her master's degree in Zoology from Notre Dame in 1940.

For the sisters, studying at public institutions was a benefit. Exposure to the ideas of public education was needed to integrate much of the content that public colleges adhered to remain in good standing and receive state recognition (Ryan, 2019). Sisters studying at public institutions provided the foundation of knowledge at the College of St. Benedict. The college was modeled after the University of Minnesota to have the best chance of becoming accredited. The earlier sisters were only given time off only for advanced degrees and not to obtain a bachelor's degree. Six sisters worked on bachelor's degrees in sciences for years, not completing their degrees until they were in their forties. This usually meant one class at a time in the summer because their year-long assignment teaching in K-12 schools did not permit time off. The average age for the sisters who studied science to obtain a bachelor's degree was 30. The age gradually decreased after the 1930s when the sisters completed their bachelor's degrees before they were given a teaching assignment. Requirements for teaching had become more rigid by regulating agencies.

The college grew slowly from three students in 1913 to only 35 ten years later; however, enrollment reached as high as 514 in 1960. The faculty also grew from ten faculty members, all religious, in 1913, who taught in both

college and academy, to 48 full-time faculty members in 1960, seven of them lay faculty, with thirteen Ph.D.'s and 25 master's degrees. In 19l3, there were three functioning majors. By 1932, eleven majors were fully accredited by the University of Minnesota: biology, chemistry, English, French, German, history, home economics, Latin, math, music, and sociology (Adkins 2013). The increase in enrollment meant more sisters obtained science degrees to fulfill the college's needs. The shifting needs often changed the direction of the coursework and degrees for the sisters. Some of the sisters who obtained bachelor's degrees in sciences changed direction to receive advanced degrees in counseling, religious education, library science, or something else needed as the college evolved. Eleven of the forty sisters who graduated with degrees in biology and chemistry completed doctorate degrees, and sixteen completed master's degrees. However, the duration for the sisters to complete their science degrees was not simple or a straight path. The path was not in a specific order, nor was the path what they chose, but with the vow of obedience, they completed the task.

One pivotal change in the need for women scientists began in 1961 with unique cooperation with the male counterpart college St. John's University. Courses would now be coeducational and academic departments now shared classes. Men faculty may have had an edge in retaining faculty positions. Some sisters were given new assignments, and others remained in the college because enrollment was stable. The hiring of lay faculty continued as enrollment soared. In addition to the college changes, the closing of Catholic high schools changed the teaching responsibilities and the need for the sisters to study science. In 1973, the last sister graduated from the College of St. Benedict in science. Later, she completed her Ph.D. in Zoology at the University of Minnesota in 1990 and returned to join the faculty at the College of St. Benedict, where she still teaches biology courses.

Assignments and Opportunity

Despite the long duration of obtaining a degree, the sisters did not have to worry about two significant factors, the cost of attending college and a job after completion. Instead, the prioress selected the sisters for the specific role. Even in the later years, when lay people were obtaining positions at the college, the sisters were given college-level teaching roles due to the preferential hiring agreements. Many opportunities to live and study throughout the United States and abroad were common opportunities among the sisters who studied science. Some noted colleges include Cornell, Max Planck Institute, Argonne Laboratories, Notre Dame, Vanderbilt, Berkeley, and Marquette, with funding from the National Science Foundation and even

Fulbright scholarships. Studying science also provided a voice for the sisters in a male-dominated field as they presented research and wrote publications that reached an audience outside the community. Most of these study opportunities were in the summer and funded by grants. Some unique experiences early on included S. Maxine Simmer taking advantage of a program at the University of Minnesota as a part of a WWII initiative to instruct teachers on aviation theory and science to grow a population of pilots. S. Maxine was the first sister to obtain a pilot's license in the United States and never wore the required parachute because she wanted to wear her habit. Traveling was not uncommon for the sisters. Notes in archive files show itineraries of trips by the sisters and students to study in other locations off-campus, which seemed to be a precursor to what is now study abroad programs found at the college.

The role of teaching was the primary reason for degrees at all levels in the sciences. Teaching science in K-12 had stricter guidelines in the state over time. The college-level teaching also required advanced degrees for accreditation of the college. Curriculum design was an integral part of the roles of the women who studied science. Except for a few sisters, teaching elementary, high school, and college-level courses was extensive. Workshops and conferences were led by many science teachers, bringing in scientists from other parts of the world. Even for grade school education, the training of hands-on science curriculum was a signature characteristic in the curriculum developed by the sisters, funded by a large grant in the 70s. The curriculum implementation was supported throughout the Catholic schools because many sisters served as principals as their assignments transferred out of the classroom.

Leadership and Legacy

A unique pattern existed among those who taught science; over 20 of the sisters who studied science later obtained leadership assignments. For example, two sisters became college presidents, and others served as deans, principals, hospital or nursing home administrators, department chairs, prioress, and superiors. Perhaps the same dispositions needed to persevere in a science-related career are similar to those required to be a leader. Moreover, a benefit to joining the religious order allowed the sisters to hold positions lay women could have never obtained in the early years.

As the sisters moved out of careers teaching science as they aged, yearly assignments often involved serving the monastic community in positions needed by the community at the Motherhouse and the retirement nursing home St. Scholastica owned by the sisters. Examples included working at the gift shop, museum, guest house, and documenting the history in

the archives. The prioress gave yearly work assignments until a sister could no longer work. The sisters never really retired. Many sisters took on hobbies such as winemaking, gardening, crafting, photography, and golfing.

Perhaps the lasting legacies may be the women who graduated in the sciences since 1913 who the sisters mentored. Over 1300 women have graduated in biology, chemistry, and physics. In addition, hundreds have graduated in nursing, nutrition (formerly home economics and dietetics), exercise and sports sciences, and environmental science. The sister scientists were pioneers. Not many opportunities exist where women were taught only by women. The women opened doors in the sciences to see that women can study science and they do belong in science-related fields. Even when the academic cooperation began with St. John's University and coeducational classes, the women's college still upheld its identity to empower women to continue to pursue science degrees. The Benedictine spirit of community and the sense of belonging among women in science was established in 1913 and holds strong today.

Discussion

Driven to provide women with educational opportunities, the sisters of the Order of St. Benedict expanded a high school academy to become a strong women's college in the Midwest. Today, the College of St. Benedict is one of two women's colleges left in Minnesota and one of the few left in the United States. Science majors may not have been the primary reason for attracting young women to college. Still, classes in the sciences have been an integral part of other majors leading to careers in dietetics (nutrition) and nursing, leading to sisters seeking advanced degrees in biology, chemistry, and physics over the years.

Data revealed that the sisters' opportunities and success in the sciences were a complex issue that may be more related to the rule of obedience than the actual interest in the sciences. The need of the community superseded the career direction of these women. Before the establishment of the college, the sisters were teachers and valued education, but many began teaching with little education. One sister learned how to teach science weekly, visiting an elder sister to plan one week at a time on Friday night and Saturday. This went on for almost two years. As the requirements changed for teaching, sisters took college courses over the summers. In 1913, starting a college shifted the need for college credentialed faculty and a stimulus for the first sisters to begin studying and obtaining advanced degrees one step ahead of the students. Many of the sister's oral histories reveal the academic challenges during graduate school. This was no surprise because some started graduate degrees with

inadequate preparation. This could also be attributed to skipping classes to finish their undergraduate faster or because they studied independently and took exams. Also, the long duration between summer classes made the learning difficult, the courses were disconnected. Perseverance was key, but once they got a degree, it was challenging to continue the research required for extensive publications at a small liberal arts college when the priority was placed on teaching. It is unknown whether it impacted the sisters' ability to climb promotion ranks at the college level. Research was secondary except for one sister who was allowed to live with family and continue to do research, and did not return to the college to teach. Instead, she established a Korean Catholic faith community and maintained her research career. Most sisters who obtained advanced degrees had additional opportunities to participate in summer workshops, research projects, or even another degree, depending on the need.

Although the yearly assignment changes were frequent among the sisters, moving was just part of the religious life. Even if assignments didn't change, the sisters moved to different locations, even around the St. Joseph area. The large membership of the monastery allowed for sisters to move and start other monasteries spreading community members throughout the United States. Although one could say that living in a religious community provided job stability, no guarantee was made on what you would be doing or where you would be living. You followed The Rule of Saint Benedict.

The findings of this study are unique to the setting. Still, they may provide evidence that the path to studying science was not immune from hurdles for the sisters even though they did not have the challenges of other women of marriage and family. One question remains about the earlier sisters who studied science. How were they welcomed in a male-dominated world? Did their religious life benefit them? Who would have turned a sister away? The sisters were exceptional researchers. Evidence in personal files indicates this, with letters from institutions noting the excellence and extending opportunities to allow the sisters to finish their work or grant the extension to complete a Ph.D. On the other hand, many oral histories note the challenge of studying at a higher level, with the difficulty of the coursework working in an all-male environment.

The footprint left by these forty science sisters, whether from a high school or college level, was that these sisters were role models in science. Not only did they provide access to higher education for women, but they also provided access to science courses that would build interest for some women to study science who may not have thought of a science career from the start.

Professor gender has been found to have little impact on male performance but had a powerful effect on female students' performance in math and science classes and the likelihood of taking other math and science courses (Carrell, Page, and West 2010). When a woman can see another woman teach and "do" science, it becomes a possibility for them to pursue this career. Women colleges had always educated women scientists, employed them, and encouraged them even when the policy excluded them from pursuits (Sebrechts, 1992). As the number of women's colleges continues to decline, the importance of women faculty should not be overlooked as a way to build interest in women to explore with science careers.

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