

Interpreter

**A Journal of Latter-day Saint
Faith and Scholarship**

Scientist Apostles

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Article Print

Pages 41–68

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ISSN 2372-1227 (print)
ISSN 2372-126X (online)

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Scientist Apostles

David L. Clark

Abstract: *James E. Talmage, John A. Widtsoe, and Joseph F. Merrill brought unusually strong scientific training to the Quorum of the Twelve Apostles of The Church of Jesus Christ of Latter-day Saints, joining the quorum between 1911 and 1931. Tracing their education, scientific work, publications, university leadership, and ecclesiastical service, this paper details how each combined intellectual rigor with religious commitment in distinctive ways. Talmage, a geologist, defended the compatibility of science and faith, accepted geologic time and biological evolution while qualifying human origins, and gained international recognition for his geological work and museum contributions. Widtsoe, trained in chemistry, became an influential agricultural scientist whose research on soils, irrigation, and dry farming achieved worldwide reach while he also helped shape higher education in Utah and Latter-day Saint thought. Merrill, a physicist by training, redirected much of his career toward education, becoming instrumental in developing the Church's seminary and institute programs while consistently affirming science as a legitimate avenue to truth. Considered together, their careers illuminate the interplay of science, education, and religion in twentieth-century Latter-day Saint leadership, leaving open the broader question of how their scientific backgrounds may have influenced Church culture and policy.*

This paper provides an overview of the lives of three Apostles who were trained scientists as well as a summary of their scientific and ecclesiastical accomplishments prior to and following their apostolic callings. It proposes that these three could have succeeded in a variety of significant cultural endeavors even if they had remained lay members of the Church. James E. Talmage (PhD, University of Illinois

Wesleyan, 1896, geology) was ordained an Apostle in 1911. John A. Widtsoe (PhD, University of Göttingen, 1899, chemistry) was ordained an Apostle in 1921. Joseph F. Merrill (PhD, Johns Hopkins University, 1899, physics) was ordained an Apostle in 1931. The three were named to the Quorum of the Twelve at ten-year intervals beginning in 1911. They served together in the Quorum for three years, 1931–1933.

These three Apostles took conventional paths in their educational training, but their postgraduate professional work was more diverse. Talmage engaged in a variety of geoscience specialties including mineralogy, petrology, and geophysics. Widtsoe's primary interest was in agricultural chemistry and soil physics. Merrill's scientific activities in physics, pursued during his graduate-school training, became secondary to his later Church work, which was centered on the education of Latter-day Saint youth. Talmage received a variety of science honors from several organizations in England and Scotland. Widtsoe's agricultural achievements were documented in a variety of publications and eventually used worldwide in agricultural improvement. Merrill is credited with playing an active role both in emphasizing physical facilities for high school and university students and in selecting intellectually engaged institute directors for the education of Latter-day Saint youth.

James E. Talmage

Talmage merits first mention among the three scientist apostles because he was the first in the Church's hierarchy to receive international honors. He also published a remarkable share of the important late nineteenth- and early twentieth-century literature for the Church.¹ He was born in 1862 in England and his entire family moved to Utah in 1876. In Provo, he enrolled at Brigham Young Academy where his scholarly interests bloomed under the influence of Karl G. Maeser. Three years later, at the age of seventeen, he became so proficient

1. James E. Talmage, *Articles of Faith* (Salt Lake City: Deseret News, 1899), archive.org/details/articlesfaithas00talmgoog/page/n6/mode/2up; James E. Talmage, *The Story of Mormonism* (Liverpool: Millennial Star Office, 1907), archive.org/details/storyofmormonism0000jame/page/n3/mode/2up; James E. Talmage, *The Great Apostasy* (Salt Lake City: Deseret News, 1909), archive.org/details/greatapostasycon00talm/page/n5/mode/2up; James E. Talmage, *The House of the Lord* (Salt Lake City: Deseret News, 1912), archive.org/details/TalmageTheHouseOfTheLord/page/n7/mode/2up; James E. Talmage, *Jesus the Christ* (Salt Lake City: Deseret News, 1915), archive.org/details/jesusthechrist1915/page/n3/mode/2up.

that he began teaching at the Academy. While still learning and working with Maeser, he developed a great interest in geology despite a widespread belief at that time that basic geologic explanations were suspect.² Given such common anti-geology pronouncements, one might wonder why someone with serious religious beliefs would consider geology worthy of study. In Talmage's case, his introduction to science included chemistry and botany,³ but eventually he excelled in geology, which became his principal professional interest.⁴



Figure 1. James E. Talmage.

In the early 1880s, he pursued advanced studies in geology, first at Lehigh University and then at Johns Hopkins University.⁵

Charles Darwin's 1859 publication of *On the Origin of Species*⁶ resulted in widespread conflict between science and religion. In December 1881, at age nineteen, Talmage's diary records his desire to help young people understand the conflict. He did this by lecturing on his belief that there was actual "harmony between Geology and the Bible."⁷ His ideas were greatly influenced by James E. Dana, one

2. Andrew Dickson White, *A History of the Warfare of Science with Theology* (New York: D. Appleton, 1898), 1:223, archive.org/details/in.ernet.dli.2015.43514/page/n3/mode/2up.

3. Dennis Rowley, "Inner Dialogue: James Talmage's Choice of Science as a Career, 1876–84," *Dialogue* 17, no. 2 (1984): 112–13, dialoguejournal.com/articles/inner-dialogue-james-talmages-choice-of-science-as-a-career-1876-84/.

4. Rowley, "Inner Dialogue," 114.

5. John R. Talmage, *The Talmage Story: Life of James E. Talmage—Educator, Scientist, Apostle* (Salt Lake City: Bookcraft, 1972), 36–46, 47–55, archive.org/details/talmagestorylife0000talm/page/n5/mode/2up. In addition to his doctoral degree from Illinois Wesleyan in 1896, he received an Honorary Doctorate from Lehigh University in 1912.

6. Charles Darwin, *On the Origin of Species by Means of Natural Selection* (London: John Murray, 1859), 502, archive.org/details/onoriginspecies00darwa/page/ii/mode/2up.

7. James P. Harris, ed. *The Essential James E. Talmage* (Salt Lake City: Signature

of Yale University's best-known geologists and a devout Christian who wrote that there was no science-religion controversy; there was only misunderstanding of one or both.⁸ Talmage expanded on this idea and spent much of his life defending it.

Talmage may have been influenced by an idea of harmony between science and religion similar to that found in an older tradition of natural theology formulated by William Paley.⁹ Paley's natural theology was based on the argument that nature contains definite, even compelling, evidence of the existence of a perfect God.¹⁰ More importantly, Talmage asserted that Darwin did not intend to destroy traditional orthodox Christian belief because "the works of nature were evidence of the hand of God."¹¹ Science only offers details of God's method of creation. Talmage adopted this idea, and early in his career he stated that his purpose in life was to defend science against attacks by theologians.

I have many times contemplated my probable destiny and mission in life . . . [and] for some time past felt an intense desire to become familiar with the walks of Science for the Sciences have to be redeemed from their present position of infidelity & skepticism. The idea has been a favorite one for my meditations of late, and has formed the theme of my public speaking. I conclude that this great mission has to be performed by the Priesthood of God, and . . . such work is perhaps my mission in life.¹²

Books, 1997), 4.

8. James E. Dana, *Manual of Geology* (Philadelphia: Theodore Bliss, 1863), 786, archive.org/details/manualofgeologyt00dana/page/n7/mode/2up. Also, Rowley, "Inner Dialogue," 119.

9. Paley argued that the order and complexity observed in nature provided evidence of a divine designer. Paley's approach was increasingly challenged during the nineteenth century, particularly after Charles Darwin's evolutionary theory offered a natural explanation for the apparent design of living organisms. For more on Paley's natural theory, see William Paley, *Natural Theology: Or, Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature* (London: R. Faulder, 1802). Multiple editions of the book were published in America throughout the nineteenth century.

10. Herbert Hovenkamp, *Science and Religion in America 1800–1860* (Philadelphia: University of Pennsylvania Press, 1978), 23, archive.org/details/scienceligioni0000hove/page/22/mode/2up.

11. Cynthia Eagle Russett, *Darwin in America, the Intellectual Response 1865–1912* (San Francisco: W. H. Freeman, 1976), 3.

12. Harris, *Essential James E. Talmage*, 4.

Talmage's defense of science remained an important commitment throughout his life and was further amplified following his 1911 calling as an Apostle.

Achievements in research

Talmage's scientific research included work primarily in the Wasatch and adjacent mountains of northern Utah. He also did work in central and southern Utah in the Glen Canyon area. He was among the first to recognize that granite used in the construction of the Salt Lake Temple, quarried in Little Cottonwood Canyon, was not part of an ancient Archean mass, as originally classified by other geologists. Rather, the granite was part of a massive intrusive body he recognized as a geologic laccolith. More recent work has reclassified this igneous rock as a geologic stock.¹³ Originally, the granite was determined to be hundreds of millions of years old, an age similar to the age of rocks elsewhere in Utah. Accurate geochemical dating now indicates the age of the temple granite stock to be in the thirty-million-year range, a significant revision of both its estimated age and its interpreted manner of formation.

Talmage collected uranium samples from an unidentified location in the Uintah Mountains and developed a unique method of removing radium from the uranium for use in his experiments with radioactivity. Using lead containers as a safety precaution, he recorded measurements of radium radiation and its effect on termites and ants. The details of his method of radium extraction should have been published in a scientific journal. Curiously, however, a brief description of his research was published only in *The Improvement Era*.¹⁴ He also examined fossiliferous Paleozoic limestones in the Adam-ondi-Ahman area of western Missouri but did not complete a description or documentation of the abundant fossils he referred to in his controversy with Joseph Fielding Smith.¹⁵

Talmage's scientific interests were broad. In addition to geochemistry and stratigraphy, they included chemistry and the history of the

13. Lehi F. Hintze and Bart J. Kowallis, *Geologic History of Utah*, rev. ed. (Provo, UT: Brigham Young University [BYU], 2021), 14, 216.

14. James E. Talmage, "Radium," *The Improvement Era* 7, no. 9 (July 1904): 689–98, archive.org/details/improvementera0709unse/page/688/mode/2up.

15. David L. Clark, "James E. Talmage's Paleontologic Solution for a Theologic Controversy," *Latter-day Saint Historical Studies* 22, no. 2 (2021): 73–80.

Great Salt Lake, geomorphology of southern Utah, mineralogy, crystallization of salt, optical properties of oolites,¹⁶ structural geology of northern Utah, volcanism, and seismology. His work in seismology included the 1909 installation of seismograph equipment at the University of Utah, the first in the Mountain West.

Published results of his research generally consisted of brief abstracts rather than extensive documentation of methods and results. These included eight publications from 1889 to 1907 in the journal *Science*. In 1896, Talmage published an abstract in another prestigious scientific outlet, *The Journal of Geology*. Other publications included abstracts or short articles in a variety of less prominent magazines and journals. Those included the *Scottish Geographical Society*, the *University of Utah Quarterly*, *The Contributor*, *The Enquirer*, and several Utah newspapers. Benjamin Miller concluded that the total number of Talmage's publications, if all were identified, exceeded 700.¹⁷ Even with such a large number, Talmage's scientific activities remained little known simply because he did not publish the detailed results of his research. He was chided for this failure by his friend Herbert Gregory of Yale University. Talmage provided an explanation at that time: "One of the serious mistakes I made during my professional career was the failure to publish properly . . . I have lost the credit of some important work through priority of publication by others."¹⁸

Talmage did produce two self-published science textbooks for his students: *First Book of Nature* (1888) and *Domestic Science* (1891). While he admitted regret in not publishing details of his *scientific* work, it is interesting to note that he had no hesitation in publishing his theological compositions in considerable detail.¹⁹

Talmage recognized the utility of Darwin's theory of natural selection in explaining the millions of invertebrate and vertebrate species that have lived on Earth. He accepted Darwin's idea and refused to discard it because of what was widely considered an apparent conflict

16. An *oolite* is a sedimentary rock composed of ooids, which are tiny, rounded grains that often resemble small fish eggs.

17. Benjamin L. Miller, "Memorial of James Edward Talmage," in *Proceedings of the Geological Society of America* (New York: Geological Society of America, 1934), 259–72.

18. James E. Talmage to Sterling Talmage, 21 May 1931. Certainly, Talmage could have published more of his scientific work, but after his apostolic call he spent most of his writing time publishing Church-related materials.

19. Talmage published seven major Church-oriented volumes, four of which were published before his apostolic calling.

with biblical descriptions. His most significant statement on evolution may be:

I have been unable to see the point of conflict myself:—my belief in a loving God perfectly accords with my reverence for science, and I can see no reason why the evolution of animal *bodies* cannot be true—as indeed the facts of observation make it difficult to deny.²⁰

Talmage sustains this declaration and expands his ideas on evolution in a 1931 talk that was later published in a Church magazine. In it, he suggests that he had no problem with an Earth that had

passed through ages of preparation, to us unmeasured and immeasurable. . . . From the fossil remains of plants and animals found in the rocks, scientists point to a very definite order in the sequences of life embodiment, for the older rocks, the earlier formations, reveal to us organisms of simplest structure only. . . . These primitive species were aquatic; land forms were of later development. Some of these simpler forms of life had persisted until the present time, though with great variation as the result of changing environment.²¹

This clear statement indicates his acceptance of natural selection as the explanation for evolution of animal and plant life. However, Talmage had major reservations about the details of Darwin's theory that placed man as a part of primate evolution. He most likely would have agreed with President David O. McKay's idea of the dual nature of man, a view suggesting that bodies and their souls have different origins—animal bodies were formed by natural selection; human souls, by divine implant.²² The idea of the dual nature of man was frequently referred to by President McKay both during and after Talmage's lifetime and may have been inspired by his years of close association with Talmage, first as his student at the University of Utah in the late nineteenth century and later when McKay was replaced by Talmage as European mission president in 1924. Of course, they were together in the Quorum of the Twelve for twenty years. The dual nature of man

20. Harris, *Essential James E. Talmage*, 5.

21. James E. Talmage, "The Earth and Man," *The Instructor* 100, no. 12 (December 1965): 475, catalog.churchofjesuschrist.org/assets/9c7d5bea-8781-495f-a061-caa27975f08e/0/0.

22. David O. McKay, *Gospel Ideals: Selections from the Discourses of David O. McKay* (Salt Lake City: Deseret Book, 1976), 395.

was referred to by McKay in at least six General Conference talks beginning in 1928, as well as in several of his books.²³

President Gordon B. Hinckley's succinct 2002 summary makes the Church's position clear: "What the Church requires is only belief 'that Adam was the first man of what we would call the human race.' Scientists can speculate on the rest."²⁴

In Talmage's various encounters with society's conflicts regarding science and religion, it is important to note that in the late nineteenth century he was extremely pleased that there had been no criticism of science by anyone in Church leadership. "The leaders amongst us, those who are acknowledged as prophets and revelators to the people, are not heard in authoritative denunciations of the teaching of science."²⁵ This was a positive and valid statement until the later Roberts/Smith/Talmage affair in 1930.²⁶

Because details of his scientific work were not published in scientific journals, Talmage remains little known in much of the scientific world. However, he was named honorary fellow of the Royal Microscopical Society of London (1891), of the Geological Society of London and the Royal Scottish Geographical Society of Edinburgh (1894), and later of the Royal Society of Edinburgh. In the United States, he was elected to the Tau Beta Pi Honorary Society at Lehigh University.²⁷

But how was Talmage recognized with such honors when he had only a limited scientific publication record? There is a curious answer. In 1892, the First Presidency asked Talmage to study recently discovered rock writings in southeast Utah that were suspected to be ancient Indian artifacts. Although archaeology was not his specialty, Talmage accepted the assignment and concluded that the hieroglyphics were

23. McKay, *Gospel Ideals*, 39.

24. Elaine Jarvick, "Beliefs on Darwin's Evolution Vary from Religion to Religion," *Deseret Morning News*, 19 January 2006, deseret.com/2006/1/19/19933547/beliefs-on-darwin-s-evolution-vary-from-religion-to-religion/.

25. David L. Clark, "James E. Talmage's Lecture, 'The Methods and Motives of Science,'" in *Latter-day Eloquence: Two Centuries of Mormon Oratory*, ed. Richard Benjamin Crosby and Isaac James Richards (Urbana, IL: University of Illinois Press, 2026), 142, emphasis added.

26. Richard Sherlock and Jeffrey E. Keller, "The B. H. Roberts/Joseph Fielding Smith/James E. Talmage Affair," in *The Search for Harmony*, ed. Gene A. Sessions and Craig J. Oberg (Salt Lake City: Signature Books, 1993), 93–115.

27. Talmage, *Talmage Story*, 138.

simply crude forgeries. More recent studies suggest that many of the petroglyphs originated with the Fremont culture.²⁸

One significant benefit of the trip was that local residents recommended that Talmage take a side trip into what is today Capitol Reef National Park. He was invited to examine an unusual mineral deposit of selenite (gypsum) crystals.²⁹ Selenite is the translucent, crystalline variety of gypsum, a calcium sulfate mineral that is formed as part of evaporitic processes but whose occurrence in large crystals is rare. Small specimens are common and can be collected from the exposed salt flats of the Great Salt Lake. However, the large crystals that Talmage removed, which were four to five feet in length, were formed approximately 160 million years ago in cavities that existed in tidal flats of a shallow sea that covered the present Capitol Reef area. The site of the discovery is now known as Glass Mountain.

Talmage immediately recognized the value of this unique geologic occurrence. He collected many specimens for both the Brigham Young University Museum and his small Deseret Museum in Salt Lake City (see figure 2). In addition, he believed the unusual specimens merited international attention. Rather than publish the results of his investigations (which he arguably should have done), in 1893 he prepared several of the larger specimens for transportation. He took them to several natural history museums in England and Scotland. Talmage may have hoped that these donations to European museums would result in his Deseret Museum receiving unique European material in exchange.

The unsolicited gifts were graciously accepted by the "Royal Society of Edinburgh, the South Kensington Natural History



Figure 2. Selenite (gypsum) crystals collected by Talmage and on display in the Eyring Science Center, BYU. (Photo by the author.)

28. National Park Service, "Fremont Culture Petroglyphs," *Capitol Reef National Park*, [nps.gov/care/learn/historyculture/Fremont-culture-petroglyphs.htm](https://www.nps.gov/care/learn/historyculture/Fremont-culture-petroglyphs.htm).

29. Talmage, *Talmage Story*, 114.

Museum (a branch of the British Museum), the museums of Cambridge and Oxford Universities, the Museum of Practical Geology in London, the international Museum Association, and the Institute of France, in Paris.”³⁰ He also delivered specimens to the Royal Microscopical Society of London.³¹ With these newly acquired specimens, the various organizations constructed special exhibits for the large selenite crystals. It was not long before they were recognized as “the outstanding selenite specimens in the world.”³²

Talmage returned to Europe the following year. This time, he brought specimens that he intended as replacements for similar but less spectacular specimens in the Berlin Museum of Natural History. At the time, the specimens in the museum were claimed to be outstanding world specimens. The Utah crystals “far outshone their own prized exhibits.”³³

With the several deliveries of specimens, Talmage was asked to lecture on their origin. Doing this launched friendships with several important European scientists. In one presentation to the Royal Microscopical Society of London at its annual meeting, Talmage gave small specimens of the selenite crystals, individually wrapped, to all 150 society members. In a visit to Edinburgh, he was told that he was to be nominated for membership in the Royal Society of Edinburgh.³⁴

The English and Scottish honors he received could not have been based solely on his minimal published scientific record. The receipt of honors could have been based on his service as director of the Deseret Museum since 1890, along with the fact that he helped organize the University of Utah, where he served as its first president. However, Talmage’s unique mineral gifts to the English, Scottish, French, and German museums, accompanied by what must have been stimulating lectures on their origin, were important factors—perhaps the most important—for the European honors he received.

In addition, from 1895 to 1900, Talmage gave numerous lectures in Utah and a few other places in North America. Lecture topics included volcanoes, crystals and crystallization, geysers and hot springs, ice and snow, and a variety of non-geologic subjects ranging from

30. Talmage, *Talmage Story*, 116.

31. Talmage, *Talmage Story*, 116.

32. Talmage, *Talmage Story*, 117.

33. Talmage, *Talmage Story*, 117.

34. Talmage, *Talmage Story*, 116.

butterflies to muskrats, entomology to meteorology, and the fact that the Great Salt Lake was a remnant of prehistoric Lake Bonneville.³⁵

Lifestyle changes

Talmage's European visits continued in the summers of 1897 through 1899, most of which involved attendance at scientific meetings. His mineral-exploration consulting and his work as Deseret Professor of Geology at the University of Utah kept him busy, so there is little indication of his involvement in serious scientific research during this period. In 1899 and 1909, he had special meetings with the First Presidency, who were considering publishing an article on the origin of man. The outcome was not reported. However, he later gave a talk with the same title to Salt Lake City's Eleventh Ward in 1911.³⁶

A curious but important collateral benefit of Talmage's honors was his ability to help heal some of the "social wounds" the Church had suffered as a result of B. H. Roberts's temporary 1888 "exile in England." During that period, Roberts engaged in a series of rancorous debates with William Jarman, a former mental patient and successful muckraker. Jarman's claims against the Church were scandalous and often ridiculous. They sometimes resulted in violence and even mob action. The trouble began in London, then spread to Swansea and Cardiff in Wales, and eventually to Glasgow in Scotland. Roberts's debates, undertaken to reason with British commoners concerning Jarman's unfounded claims, did nothing to assuage anti-Mormon feelings and further damaged the Church's reputation at the height of the international controversy over polygamy.³⁷

A decade later, Talmage, by then a respected fellow of the prestigious Royal Society of Edinburgh, gave gospel-oriented lectures in London, Liverpool, Newcastle, Glasgow, and Belfast. These were several of the cities that were previously hostile to Roberts and the Church, but where Talmage was welcomed and honored because he was a fellow in several prestigious English organizations. Talmage's travel included attendance at the International Geologic Congress in St. Petersburg in 1897 and visits to different European sites in 1898.

35. L. Tom Perry Special Collections, Harold B. Lee Library, BYU, MS 229, "Register of the James E. Talmage Collection, 1876–1933."

36. Harris, *Essential James E. Talmage*, 7–8.

37. See Truman G. Madsen, *Defender of the Faith: The B. H. Roberts Story* (Salt Lake City: Bookcraft, 1980), 167–76, archive.org/details/defenderoffaith/b0000mads/page/166/mode/2up.

By the end of these visits, Talmage was successful in redeeming the Church's reputation from a low point resulting from Roberts's negative experience and allaying the prejudices held by some people in the British Isles. That gave some comfort to Roberts as well as a much-appreciated public relations boost for the Church.

In 1900, Talmage was asked to reformat the Pearl of Great Price into a standard scriptural format, and in 1905, among other things, he was asked to assemble his lectures and thoughts into a volume that, after his 1911 apostolic calling, would be published as *Jesus the Christ*.³⁸

In 1907, he resigned his professorship at the University of Utah, having completed his geophysical work of installing the first seismograph for geophysical observations in the Mountain West. With only his job as a consulting geologist demanding his time, he was able to assume additional assignments from Church authorities.

On 8 December 1911, Talmage accepted a call to the Quorum of the Twelve Apostles. His calling could have terminated his scientific and scholarly activities, but it did not. It only slowed them down. According to diary entries, twice later in the same month as his calling, he gave talks on the origin of man. Less than a year later, his continued defense of science included a lecture titled *Mormonism and Science*. A few years after that, in March 1922, he gave a lecture in Pittsburgh entitled *The Origin and Destiny of Man*. He recorded that his audience responded with a variety of questions, none of which was related to the subject of his lecture. The audience included several atheists and others who were there to mock attempts to explain a method of man's creation with God as the Director. A segment of the audience was predictably unhappy with his remarks.³⁹

Talmage managed to combine some limited professional interests with his work as an Apostle. For example, in April 1922, he and a fellow Apostle, John A. Widtsoe, attended a meeting of the American Association for the Advancement of Science in Salt Lake City. Part of the meeting included a lecture by Widtsoe on Great Basin research. At the meeting, a talk by David Starr Jordan, a popular scientist, on evolution and heredity did not impress Talmage. In 1923, Talmage gave an informal lecture on evolution and, in 1926, included remarks on science and religion in a memorial service for Karl G. Maeser, his early mentor.⁴⁰

38. Talmage, *Talmage Story*, 181.

39. Harris, *Essential James E. Talmage*, 8.

40. Harris, *Essential James E. Talmage*, 9.

He completed writing *The House of the Lord*, prepared articles for various Church magazines, and in 1914 was asked by the First Presidency to complete "with as little delay as possible" the manuscript he initiated in 1905 for the book that would become *Jesus the Christ*.⁴¹ In response, Talmage, temporarily relieved of normal apostolic duties, worked during every free hour for the remainder of 1914 and part of 1915, sometimes seven days a week, writing the manuscript that was completed in April 1915.

In 1931, two years before his death, unhappy with his colleague Joseph Fielding Smith's dismissiveness of both science and scientists,⁴² Talmage delivered, in the Tabernacle, his final defense of science. He was pleased that his lecture was soon published with the First Presidency's approval.⁴³ His son Sterling, also a geologist, continued his father's defense of science against Smith, a disagreement that led to years of unfortunate animosity between the two families.

John A. Widtsoe

A second scientist apostle, John Widtsoe, spent his early years on the small island of Froya, off the coast of Norway, almost due west of the mainland town of Brekstad. John was born in 1872, ten years after the birth of Talmage. The Widtsoe family joined the Church and, in 1883, John relocated to Utah with his widowed mother and his brother. The family found a small home in Logan, where John enrolled in school and quickly learned to speak English. Both within and outside public schools, he studied on his own and with tutors. In his second year at Brigham Young College in Logan, he did so well that he was hired to teach algebra.⁴⁴ With what must have been an unusually strong education both in Norway and Logan, Widtsoe next studied at Harvard University, where he received both BS and MS degrees.⁴⁵ He later

41. Talmage, *Talmage Story*, 181.

42. Joseph E. Keller, "Discussion Continued: The Sequel to the Roberts/Smith/Talmage Affair," *Dialogue* 15, no. 1 (Spring 1982): 85, dialoguejournal.com/articles/discussion-continued-the-sequel-to-the-roberts-smith-talmage-affair/.

43. Keller, "Discussion Continued," 79–96. The entire story of approval by the First Presidency is documented in Keller's review. The talk was published in the Church Section of the *Deseret News*, in a Church magazine (see Talmage, "The Earth and Man"), and in pamphlet form.

44. Thomas G. Alexander, *John A. Widtsoe Scientist and Theologian, 1872–1952* (Salt Lake City: Signature Books, 2023), 11, 12.

45. John A. Widtsoe, *In a Sunlit Land: The Autobiography of John A. Widtsoe*

wrote, “Harvard was good to me. It was literally my alma mater. I have tried in my life to be worthy of that which I received from this great university.”⁴⁶

Widtsoe was exposed to a variety of natural sciences but was attracted to chemistry because he believed that it would help him understand that “there was a chemical aspect to everything on earth and in the heavens.”⁴⁷ After completing his Harvard studies in 1894, he was offered and accepted a position as a chemist at the newly established land-grant



Figure 3. John A. Widtsoe.

Utah Agricultural College in Logan. He began his research at the Experimental Station by studying Utah’s desert soils. Agriculture, of course, begins with the soil, and immediately he was involved with a variety of agricultural soil projects that piqued his interest in additional education.

Early in his career, Widtsoe states his objective in life: “More and more chemistry of life fascinated me. There were processes within living plants, animals and humans which must be determined. It seemed a field to which I could give my life.”⁴⁸ He also writes, “It seemed to me that among plant and animal constituents I needed most to become well acquainted with the carbohydrates — sugar and starches, and also protein — the nitrogenous substances.”⁴⁹

In 1898, this thinking led him to become a student of an excellent biological chemist in Germany at the University of Göttingen, where “There was carbohydrate talk everywhere — of starches known and starches unknown, of sugars to the right of us, and sugars to the left of

(Salt Lake City: Deseret News, 1952), 4, 5. Alan K. Parrish, *John A. Widtsoe: A Biography* (Salt Lake City: Deseret Book, 2003), 28–41, archive.org/details/insunlitland0000john/page/28/mode/2up.

46. Widtsoe, *Sunlit Land*, 39.

47. Widtsoe, *Sunlit Land*, 31; Alexander, *John A. Widtsoe*, 14.

48. Widtsoe, *Sunlit Land*, 53.

49. Widtsoe, *Sunlit Land*, 55.

us."⁵⁰ Widtsoe readily entered what today would be called biochemistry. Using a primitive mass spectrometer, Widtsoe learned to identify the occurrence of methyl pentosans in plants. He also studied the optical properties of crystals of organic substances, some not previously known. His research was not restricted to work in Göttingen. He spent limited time in Berlin and London and at the University of Zürich, where he studied mineralogic crystals. In 1899, Widtsoe graduated *magna cum laude* from Göttingen, where he earned a PhD and another MS degree. As an unexpected bonus, he received a certificate enabling him either to teach chemistry or to be employed by a chemical enterprise in Germany.⁵¹ With degrees in hand, he returned to the Agricultural College in Logan, but this time as director of the Experimental Station, where he soon established research programs that would keep him busy for the rest of his life.

His research was interrupted by various academic and political incidents. The first occurred in 1905 when he spoke against the plans of William J. Kerr, Agricultural College president, to broaden the college's primary mission beyond agricultural research to include several social programs. Such a change would duplicate programs already established at the University of Utah. Widtsoe was certain that such duplication of studies in two of Utah's colleges was premature and unnecessary. As a result, his position at the Experimental Station was terminated.

Widtsoe's termination came as a surprise, but he had developed such a solid reputation in Utah that Brigham Young University, in Provo, offered him a position. The Church, which owned the university, authorized a special salary for the young, well-trained professor. He accepted, and his presence as the only faculty member with a doctoral degree raised the university's academic standing. The expectation was that he could establish an agricultural program at the small and struggling university.⁵² During his short two-year tenure, he began a new agricultural program and was able to lay the groundwork for the development of an agricultural college.

In 1907, political problems in Logan again challenged Widtsoe. William Kerr, the man who had dismissed Widtsoe, was fired by the

50. Widtsoe, *Sunlit Land*, 56.

51. Widtsoe, *Sunlit Land*, 57.

52. Alexander, *John A. Widtsoe*, 44. Provo's Brigham Young Academy was founded in 1875 and operated under that name until 1903, when it was renamed Brigham Young University.

Agricultural College's board of trustees. Widtsoe was asked to return to Logan as the replacement for Kerr, a position he accepted and held until 1916. During his tenure in Logan, he developed various programs while also reflecting on ecclesiastical concerns. Those reflections resulted in the publication of two Church-related books.⁵³

Meanwhile, the decade of the 1910s was one of turmoil for the University of Utah. A 1914 commencement address was critical of Church influence at the university, resulting in several faculty members being demoted or not having their contracts renewed. University president Joseph T. Kingsbury defended the actions, but in 1915 the controversy deepened. Student and faculty protests resulted in roughly a third of the faculty resigning. The crisis contributed to Kingsbury's resignation and the search for a new president.

Widtsoe was one of the leading candidates for the position and was ultimately selected.⁵⁴ He left the Agriculture College and began his tenure at the University of Utah in January 1916. He was responsible for guiding the university through the difficult years of World War I and the demobilization efforts that necessarily followed. He held the position until early 1921 when he was called to the Quorum of the Twelve Apostles. There, he served as Commissioner of Church Education twice, first in 1922 through 1924 and later in 1934 through 1936.⁵⁵

Research accomplishments

Widtsoe later wrote, "It was the experimental [research] work that fascinated me. As chemist to the experiment station, a good part of my time was devoted to investigation . . . there were days of thinking."⁵⁶ In the years immediately following, this thinking proved productive. In contrast to Talmage's lack of detailed publishing, Widtsoe published the results of his research in experiment station bulletins, books, and chemical journals. Between 1897 and 1913, he published eighteen articles in the *Utah Agricultural Experiment Station Bulletin*. In addition,

53. John A. Widtsoe, *Joseph Smith as Scientist: A Contribution to Mormon Philosophy* (Salt Lake City: General Board, Young Men's Mutual Improvement Association, 1908), archive.org/details/josephsmithassci0000john/page/n3/mode/2up; and John A. Widtsoe, *A Rational Theology: As Taught by the Church of Jesus Christ of Latter-day Saints* (Salt Lake City: General Priesthood Committee, 1915), archive.org/details/rationaltheology0000john/mode/2up.

54. Parrish, *Widtsoe*, 161.

55. Parrish, *Widtsoe*, 357, 523.

56. Widtsoe, *Sunlit Land*, 47.

from 1908 to 1952, Widtsoe published additional books, four of which were related to his scientific work, mostly on irrigation farming. He also found time to publish books devoted to theological and social issues.⁵⁷ His research centered on irrigation, alfalfa, sugar beets, soil chemistry, and the effect of air pollution on crop growth. "His chemical analysis led to the formation of suitable cropping systems for various areas throughout the state."⁵⁸

His 1921 calling as an Apostle certainly altered what had been most important in his life, but it did not result in the abandonment of his research interests. From 1924 to 1927, he occasionally returned to his specialty and was able to lecture on irrigation in addition to social and moral themes.⁵⁹ He testified before government agencies, served on a number of committees related to river water use, and joined a geologic float trip down the Colorado River with a group examining possible dam sites for the Colorado River states and the Reclamation Service.⁶⁰

Certainly, his Church assignments became his primary work, but in 1932, while serving as European mission president, his continued interest in irrigation resulted in another river trip. This one was down a portion of the Nile River. There he observed different irrigation projects and learned that some of the Egyptian irrigation officials accompanying him "had been educated in France where they had used as texts French translations of some of my books."⁶¹

While none of Widtsoe's research was related to Earth history or natural selection—the themes of Talmage's interests—Widtsoe was conversant with the conflicts between science and religion. Unlike Talmage, he was reluctant to express his views on these subjects because he did not intend to become involved in the controversy. However, he became partially involved and revealed a misunderstanding of organic evolution, arguing that evolution and natural selection

57. John A. Widtsoe, *Dry-Farming: A System of Agriculture for Countries under a Low Rainfall* (New York: Macmillan, 1920), 116. Widtsoe, *The Principles of Irrigation Practice* (New York: Macmillan, 1914), 528. Widtsoe and George Stewart, *Western Agriculture* (St. Paul, MN: Webb, 1918), 474. Widtsoe, *Success on Irrigation Projects* (New York: John Wiley & Sons, 1928), 153.

58. Alexander, *John A. Widtsoe*, 22.

59. Alexander, *John A. Widtsoe*, 96, 97.

60. Alexander, *John A. Widtsoe*, 101, 107, 109.

61. Widtsoe, *Sunlit Land*, 207.

“do not necessarily go together.”⁶² Evolution, as postulated by Darwin, is explained by natural selection, and the two cannot be separated.⁶³

Most of Widtsoe’s uncertainty centered on facts that were ambiguous in 1906 but are understood much better today. His earliest publication, expressing his acceptance of geologic time and a misunderstanding of organic evolution, was in 1906.⁶⁴ In chapters 6, 7, 8, and 14, he explains his understanding of astronomy, geologic time, and organized intelligence. In chapter 14, he discusses evolution. Most of his questions and doubts expressed in this early publication are better understood today. For example, in a discussion of the first life on Earth, he suggests that “It must have been hundreds of thousands of years since the first life was placed upon the Earth.”⁶⁵ Recent research records the presence of simple cyanobacteria on Earth at least 4.5 billion years ago.⁶⁶

Widtsoe and Talmage

In his biography of Widtsoe, Alan Parrish writes:

James E. Talmage was to John a model and a mentor of science, in religious discipleship, in faithful writing, and in university leadership. Their friendship had extended over almost forty years, beginning when Talmage asked John to be his personal assistant following his graduation from Harvard.⁶⁷

Similarly, another biographer, Thomas Alexander, concludes that Widtsoe’s writings make it clear “that by the time he wrote *Evidences and Reconciliations* he believed in evolution but was unsure about how it operated in nature.”⁶⁸ Widtsoe had no problem with an old Earth

62. Widtsoe, *Joseph Smith as Scientist*, 107.

63. Darwin, *On the Origin*, 490.

64. Alexander, *John A. Widtsoe*, 159.

65. Widtsoe, *Joseph Smith as Scientist*, 53.

66. Cyanobacteria are among the principal organisms responsible for forming stromatolites. See Matthew S. Dodd et al., “Evidence for Early Life in Earth’s Oldest Hydrothermal Vent Precipitates,” *Nature* 543, no. 7643 (2 March 2017): 60–64. Also J. William Schopf et al., “Evidence of Life in Earth’s Oldest Sedimentary Rocks,” *Proceedings of the National Academy of Sciences* 115, no. 1 (2 January 2018): 53–58.

67. Parrish, *Widtsoe*, 480.

68. Alexander, *John A. Widtsoe*, 140. Widtsoe’s two books to address serious Earth and life history are John A. Widtsoe, *Evidences and Reconciliations: Aids to Faith in a Modern Day* (Salt Lake City: Bookcraft, 1943), 334, archive.org

whose age was measured in millions of years. This conclusion was reached at a time when radioactive dating was still in a primitive state. Widtsoe's discussions of the origin of Earth and its countless varieties of life were not technically cutting-edge. However, they demonstrated a qualified acceptance of contemporary scientific thought that was reasonable for someone with so little background in Earth science or life science. His interest in these subjects included frequent references to geology and geologic time. Widtsoe's understanding of natural selection was limited, and he "took a position between the outright rejection and full acceptance of natural selection," not fully understanding biological classifications.⁶⁹

In a series of confrontations between Talmage and those who interpreted Earth's history differently, Widtsoe was in full support of Talmage. In the Quorum controversy concerning Talmage's "Earth and Man" tabernacle talk in 1931, Widtsoe supported its publication, as did Reed Smoot, Joseph F. Merrill, George F. Richards, and Richard R. Lyman.⁷⁰ Widtsoe was pleased that the talk was delivered publicly and favored a speedy publication.

As I read Brother Talmage's sermon, it dealt only with two themes: 1. Did the creation of the earth occupy long periods of time, running far beyond the traditional periods of 1000 years each; and 2. Was Adam the last of the creations, as intimated in the first chapter of Genesis?⁷¹

Widtsoe answered these questions in the affirmative but indicated his weariness with the controversy in 1931: "I have been afflicted with these questions for a generation of time. It does seem high time that the Church answer them definitively or declare that it does not know."⁷²

By any measure, Widtsoe's total research and publication record was remarkable, especially considering that his full-time scientific work ended thirty years before his 1952 death. These were years when he still could have been fully productive in scientific endeavors. His calling to the Quorum in 1921 introduced a new lifestyle that

/details/evidencesreconci0000john_x0i5/mode/2up; and Widtsoe, *Joseph Smith as Scientist*.

69. Thomas G. Alexander, *Mormonism in Transition* (Urbana: University of Illinois Press, 1996), 275.

70. Sherlock and Keller, "Roberts/Smith/Talmage Affair," 103–4.

71. Parrish, *Widtsoe*, 484.

72. Parrish, *Widtsoe*, 484.

included contributing additional articles and books to Latter-day Saint literature while at the same time modifying his scientific publication.⁷³

Joseph F. Merrill

Joseph Merrill was the son of his father's fourth wife in a large polygamous family living in Richmond, a small community in northern Utah's Cache Valley. His father, Marriner, was a convert from New Brunswick who arrived in Utah in 1853. Marriner married his first wife less than a year later. This was Utah's polygamous era, and six of Marriner's sons eventually were polygamists. Joseph Merrill's early life was not easy, and the family raised its own food with effort that included milking the cow; feeding chickens, ducks, and geese; building a home; sewing all of the family's clothing; and heating the house with wood harvested from nearby canyons. However, education also was important for the Merrill family.⁷⁴



Figure 4. Joseph F. Merrill.

Joseph's interest in education was insatiable. His earliest encounter with learning may have been with Talmage's *Domestic Science* textbook, which Talmage had written for his students. A copy of the book had found its way to Cache Valley. Young Merrill soon developed an interest in chemistry, hoping that he would be able to go away to school where he could pursue its study.⁷⁵ His desire to study chemistry was realized in 1887

73. Alexander, *Mormonism*, 274. Alexander devoted chapter 14 to a review of the lack of consensus prevalent among Church authorities concerning the origins of Earth and man both before and after Talmage's 1931 talk and publication on the subject.

74. Casey Paul Griffiths, *Truth Seeker: The Life of Joseph F. Merrill, Scientist, Educator, and Apostle* (Salt Lake City: Deseret Book; Provo, UT: Religious Studies Center, BYU, 2021), 12, 13.

75. Griffiths, *Truth Seeker*, 13.

when he enrolled in the University of Deseret in Salt Lake City. He was later fully immersed in chemistry at several top-notch universities. However, his involvement in chemistry eventually led him to advanced studies in physics.⁷⁶

Graduation from the University of Deseret in 1889 marked the beginning of his serious educational pursuits. His next step was the study of chemistry at the University of Michigan. Advanced study in chemistry was satisfying for Merrill, but his father encouraged him to be constantly aware of his spiritual development.⁷⁷ Perhaps in answer to this advice, he accepted a call to serve as branch president for a group of sixty students in Ann Arbor.

After receiving a Bachelor of Science degree from the University of Michigan, Merrill returned home, where he was appointed assistant professor of chemistry at the University of Utah. He further developed his expertise in chemistry by conducting research at Cornell University and the University of Chicago during summer months.⁷⁸ Merrill completed his formal education at Johns Hopkins University in 1899, having earlier changed his major and ultimately receiving his PhD in physics.⁷⁹

Merrill returned to the University of Utah, where he was appointed to the faculty and became principal of the Mining School, beginning a university career that would span nearly thirty years. During this time, he pressed the state legislature for increased support for the university. He also played on a faculty football team and continued teaching while serving as chief administrator of the Mining School, which would soon be recognized as an important college at the university.⁸⁰

Educational accomplishments

Merrill continued the Church service he had begun as a branch president in Michigan. In 1911, he was called as a member of the Utah Granite Stake Presidency in Salt Lake City. At that time, the Church became increasingly concerned that its youth were being educated in secular schools without religious training.

Influenced by religious seminaries he had seen in Chicago

76. Griffiths, *Truth Seeker*, 73. Merrill's PhD thesis title was, "Influence of Surrounding Dielectric on Conductivity of Copper Wires."

77. Griffiths, *Truth Seeker*, 31.

78. Griffiths, *Truth Seeker*, 28.

79. Griffiths, *Truth Seeker*, 73.

80. Griffiths, *Truth Seeker*, 82, 83.

. . . Merrill worked out a plan to teach religion courses to Granite High School students, who would be released from their studies for one period a day. The teaching would take place in a building constructed by the stake adjacent to the high school.⁸¹

This new idea for seminary offerings for Utah high school students was highly successful, providing Church youth a chance to supplement their secular studies with religious instruction. In a few years, his innovative high school seminary program resulted in the establishment of twenty seminaries in Utah, Idaho, and Arizona. For Merrill, “the years 1899 to 1915 brought a period of almost uninterrupted ascendancy in his professional, ecclesiastical and family life.”⁸² While Talmage and Widtsoe focused on using their graduate-level scientific specialties in continued research and teaching, Merrill was more interested in using his graduate training to enhance educational opportunities for youth.

Recognizing the role that politics could play in influencing Utah educational decisions, Merrill became involved with minor political issues. In 1910, he defeated John A. Widtsoe in the Utah Education Association presidential election. This victory increased his prominence, and he became a speaker at several Democratic rallies. In 1912, Merrill was nominated as the Democratic candidate for the state senate, a position he assumed would be useful for influencing state school policy.⁸³ Politics aside, the education of Utah’s youth continued as Merrill’s principal professional interest.

Scientific and ecclesiastical accomplishments

The conflict between Darwinian evolution and orthodox religion reached a crescendo in 1925 as nationwide attention focused on what was referred to as the Scopes Monkey Trial. This well-publicized event may have persuaded scientifically trained Merrill to defend science. In Tabernacle talks in 1926 and 1927, he urged Church members to be as “tolerant to the spirit of science as they are tolerant to the spirit of religion.”⁸⁴ In the same talks, he notes that faith was important to both science and religion. The Church has “no quarrel with science,”

81. Griffiths, *Truth Seeker*, 91.

82. Griffiths, *Truth Seeker*, 75.

83. Griffiths, *Truth Seeker*, 98.

84. Griffiths, *Truth Seeker*, 152.

he asserted, because truth was truth and the scientific method was a useful tool for both faith and reason in the search for truth.

Merrill was asked to serve as Church Commissioner of Education in 1927, replacing Widtsoe who had held the position since 1922. Merrill was subsequently called to the Quorum of the Twelve Apostles in 1931, ten years after the call of Widtsoe and twenty years after Talmage. Even so, his education in science was not forgotten. In May 1945, he was asked to produce a series of radio talks for KSL, the Church-owned radio station, on science and religion. It was a chance for Merrill to use his graduate-school training to reconcile what seemed, to many, to be two irreconcilable matters.⁸⁵ He accepted the request, perhaps as a signal of his respect for his little-used scientific training, and he delivered twenty-seven radio talks just as World War II ended.

In 1946, the radio talks were assembled in a single volume under the direction of Richard L. Evans, at that time a Seventy in the Church's hierarchy.⁸⁶ Merrill introduced his planned subject matter in the first talk. In his second talk, he turned to scientific topics with a thorough description of the solar system. He described its size, function, and the place of our sun within it. Talks 3 and 4 shifted from the large to the small, from the universe to molecules, atoms, protons, and neutrons. Talks 5 and 7 focused on electrons and electricity, gravity, water, and immortality. The remaining talks were devoted to theological matters and their interrelation with science. Merrill's frequent references to the controversy between science and religion generally concluded with his testimony that two sources of truth cannot contradict and that science was a source of truth that could not be ignored.

"The conflict between science and religion" was a familiar expression a few years ago — not so common now. Rightly viewed and interpreted, do you think there can be any conflict between facts of science and the truths of religion? . . . Assuredly there can be no conflict between two truths. But certainly there have been severe conflicts between interpretations of facts of science and some teachings of religionists.⁸⁷

Merrill excelled in identifying parallels between science and religion.

85. Griffiths, *Truth Seeker*, 286.

86. Joseph F. Merrill, *The Truth Seeker and Mormonism* (Salt Lake City: Deseret Book, 1946), archive.org/details/bwb_Y0-CIN-441/mode/2up.

87. Merrill, *Truth Seeker and Mormonism*, 18.

However, when confronted with the thornier issues of the age of the Earth, the origin of man, or questions of biblical literalism, he chose to avoid those subjects, similar to Widtsoe.⁸⁸ When it came to the origin of life, Merrill explained, “As to the theory of organized evolution the Church has nothing to say except that the doctrines of the premortal world, of Adam and Eve, etc. are fundamental to Church theology.”⁸⁹

His late-in-life careful attention to science was not an apology for a scientific career he had not pursued, but an expression of his long-held personal belief in the value of science. It also served as a final expression of his commitment to science when he was asked to become Commissioner of Church Education. In this position, he had little time to devote to conflicts between science and religion. Instead, he was deeply involved in the divestiture of the Church’s several junior colleges during the years of the Great Depression. His innovations in strengthening the seminary program and guiding the development of institute programs at colleges and universities were significant. Institutes soon were directed by men with keen insight into academic and intellectual problems, such as Russell Swenson, T. Edgar Lyon, Lowell Bennion, Daryl Chase, and Sterling McMurrin, among many others. “Measured by the number of students, there is no doubt that the seminary and institute programs are Merrill’s most enduring legacy.”⁹⁰

Conclusions: General Authorities and Science

A different category of General Authorities with scientific backgrounds includes those with extensive science training but who are not identified as professional scientists. This is especially true of those with medical training, such as Russell M. Nelson and Dale G. Renlund. For obvious reasons, those called to full-time Church service, which requires them to leave their professional activity in medical fields, could not remain as personally involved in their former professional work as the three scientist apostles discussed in this paper.

Summarizing his admiration for the accomplishments of Talmage, Widtsoe, and Merrill, biographer Alexander writes:

88. Griffiths, *Truth Seeker*, 287.

89. Griffiths, *Truth Seeker*, 288.

90. Griffiths, *Truth Seeker*, 330. Also see Rachel Sterzer Gibson, “Seminary and Institute Enrollment Hits 1 Million in Time for Institute’s 100th Anniversary,” *Church News*, 30 March 2026, [thechurchnews.com/living-faith/2026/03/30/seminary-institute-enrollment-1-million-institute-100th-anniversary/](https://www.thechurchnews.com/living-faith/2026/03/30/seminary-institute-enrollment-1-million-institute-100th-anniversary/).

As scientists, the three enriched the church leadership by offering perspectives in the church's highest quorums, in their speeches and writings, and as they traveled throughout the church in fields other than scripture study and business.⁹¹

Their contributions to both Church and state have received substantial recognition. Academic buildings at three universities in Utah bear their names: the Talmage, Widtsoe, and Merrill buildings at the University of Utah, the Widtsoe and Merrill buildings at Utah State University, and the Talmage building at Brigham Young University.⁹²

Scientific and Church-related publications were particularly important to Talmage and Widtsoe. Important publications by Talmage include:

- *First Book of Nature* (1888)
- *Domestic Science* (1891)
- *Articles of Faith* (1899)
- *The Story of Mormonism* (1907)
- *The Great Apostasy* (1909)
- *The House of the Lord* (1912)
- *Jesus the Christ* (1915)

Similarly important publications by Widtsoe include:

- *Utah Sugar Beets* (1897)
- *Joseph Smith as Scientist* (1908)
- *Dry Farming: A System of Agriculture for Countries Under a Low Rainfall* (1911)
- *The Principles of Irrigation Practice* (1914)
- *A Rational Theology* (1915)
- *Western Agriculture* (1918)
- *Success on Irrigation Projects* (1928)
- *The Word of Wisdom* (1937)
- *Priesthood and Church Government* (1939)
- *Evidences and Reconciliations* (1943)
- *In a Sunlit Land* (1952)

Estimates of the total number of publications for these scientist

91. Alexander, *John A. Widtsoe*, 159.

92. For a time, BYU also had the John A. Widtsoe Life Sciences Laboratory Building. It was constructed in 1970 and demolished in 2015 after a more modern Life Sciences Building was opened in 2014.

apostles vary widely. One search indicates Widtsoe was responsible for forty-six publications and Talmage for fifty.⁹³ However, Miller suggests that Talmage may have been responsible for at least 700 publications, a total that includes memos, notes, and other materials.⁹⁴ Whatever the actual number, the estimated publication record is strong testimony to the intellectual vitality of the scientist apostles and the importance of their contributions to twentieth-century science and Church culture.

By any measure, their substantial accomplishments following graduate school suggest the three scientist apostles would have excelled in any scientific or educational endeavor if they had not accepted their ecclesiastical callings. Their penchant for scientific thinking prompts a final unanswered question: Did their collective scientific backgrounds have any effect on Church policies during their apostolic tenure?



[Author's Note: *This paper would not have been possible without the suggestions of several anonymous reviewers as well as Steven Clark and Bart Kowallis. I am especially grateful for the help of Godfrey Ellis, who patiently convinced me of the need to apply appropriate editorial standards to the manuscript. I gratefully acknowledge the Church History Library for supplying the photographs of Talmage, Widtsoe, and Merrill.]*

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93. These numbers were derived from searches in the Thrift Books app for all publications by James E. Talmage and John A. Widtsoe. The results produced by the app include some duplicates.

94. Miller, "Memorial of James Edward Talmage," 263.

theology and history of the restored Church of Jesus Christ and also has published in Latter-day Historical Studies, the Journal of Mormon History and BYU Studies.

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