A Tale of Two Models:

Theophilus A. Wylie and Higher Education in Nineteenth-Century Indiana

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ABSTRACT: In the mid-nineteenth century, higher education transitioned from a classical curriculum focused on moral and religious principles to a research-based one tied to industrial needs. Many professors were forced to navigate their own careers through this period. The life of Theophilus Adam Wylie, an Indiana University faculty member from 1840 to 1880, who also served as a university administrator, provides an interesting framework to reflect on this transitional period in education. Wylie saw a clear relationship between his research interests, linking science, religion, and natural philosophy into an educational mission. His role as a scholar was to find the ultimate origins of the forces acting upon the universe, and he believed those forces to be controlled by God, who was the ultimate cause. As an educator, it was essential for his students to be wise and moral people who could utilize the tools of both science and religion to understand the mysteries of nature.

KEYWORDS: Theophilus Adam Wylie, Indiana University, nineteenth-century library, higher education

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In the mid-nineteenth century, higher education was in a state of transition from its earlier emphasis on classroom teaching and a classical curriculum. The 1862 Morrill Act established land-grant universities, including Purdue University, founded in 1869. Johns Hopkins University, founded in part to further the university as a research institution, opened in 1876. Many professors navigated their own careers through this time of change. The life of Theophilus Adam Wylie, an Indiana University faculty member from 1840 to 1880, provides one example. Because Wylie was also a university administrator, his understanding and practice of both scholarship and teaching provide an interesting framework for thinking about higher education during this period of major transition.

Theophilus A. (T. A.) Wylie (1810–1895) was a cousin of Andrew Wylie, Indiana University's first president. T. A. Wylie served as a faculty member in several fields, including natural philosophy, chemistry, and ancient languages; he was also the chair of natural philosophy, and professor and emeritus professor of physics. Wylie also served as the university's librarian, vice president, and interim president (the last position, three times in 1859, 1860, and 1875). In addition to his academic duties, T. A. Wylie was also a Presbyterian minister and served as pastor of the Reformed Presbyterian Church in Bloomington.[1] Though Wylie has been largely unstudied by historians, he left a rich archive of materials now housed at the Wylie House Museum and the Indiana University Archives in Bloomington, Indiana, as well as in publications now accessible in digital collections such as the HathiTrust.

At the time T. A. Wylie was embarking on his career, the nature of what it meant to be a professional scientist and educator was being defined in the United States. Historical sociologist Andrew Abbott has discussed this transition in higher education as a trend toward "purity" in research: "Professions are organized around abstract knowledge," a process which prioritizes "those who exercise the profession's knowledge in its most pure form."[2] J. Lawrence Smith, president of the American Association for the Advancement of Science in 1872, said in his presidential address that scholars should emphasize "pure research" free from theological and

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[1] Theophilus A. Wylie, *Indiana University: its history from 1820, when founded, to 1890: with biographical sketches of its presidents, professors and graduates and a list of its students from 1820 to 1887*. (Indianapolis, Ind., 1890), 106–107; Harry G. Day, "Introduction," in Elizabeth M. Greene *Theophilus Wylie: A Transcription from the Handwritten Copy of Original Diaries* (Bloomington, Ind., Department of Chemistry, 1987), v–x.

[2] Andrew Abbott, *Chaos of Disciplines* (Chicago, 2001), 145–46.

Theophilus Adam Wylie, c. 1867
T. A. Wylie (1810–1895) was a cousin of Andrew Wylie, IU's first president. He served in a wide variety of academic duties at IU and was also a Presbyterian minister and served as pastor of the Reformed Presbyterian Church in Bloomington.
Courtesy, Indiana University Archives

religious philosophizing.[3] Smith added that teaching "unfits him [the teacher/scientist] for that free exercise of the mind which leads to new ideas and discoveries. He becomes an educational drudge instead of an intellectual scientist."[4]

Wylie would have been familiar with these ideas, as Smith came to IU to dedicate the science building in 1874 and Wylie recorded in his diary that the dedication speech was "both good and appropriate."[5] Nevertheless, Wylie's professional practice stood in contrast to the direction advocated by Smith. Indeed, Wylie was the very definition of an intellectual dilettante. He was a Presbyterian minister, professor of ancient languages, natural philosophy, chemistry, and other disciplines. He was a generalist interested in many subjects, who dedicated himself primarily to teaching, and, as such, he stands as a transitional figure in higher education. Wylie had to navigate between two models of education: the pure, specialized scientific research model advocated by Smith and many others, and the generalist model, driven by the practical needs of teaching a wide variety of classes at a small university in the mid-nineteenth century. Yet, investigating Wylie's own views about both science and education, it is clear that he did not see these two models as conflicting but rather as two parts of a unified whole. For Wylie, science, teaching, and natural philosophy (including both science and religion) were part of an overall system of higher education that was not a tale of two models, but rather of a single model that by the end of the nineteenth century had been largely discarded.

Wylie's Libraries

Two of the best sources of evidence for Wylie's views on both scholarship and teaching reside in the libraries he left behind. Wylie was the university's librarian from 1840 until about 1880, and though the library burned down twice during his tenure, some evidence still exists regarding the books he bought. Additionally, the Wylie House Museum preserves Wylie's personal collection of about seven hundred books. The university collection shows that Wylie was dedicated to education and believed that university libraries

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[3] Frederick W. Putnam, ed., *Proceedings of the American Association for the Advancement of Science* (Salem, Mass., 1873), 18.

[4] Ibid, 4.

[5] Diaries, July 5, 1874, p. 49, Folder: March 23, 1873-December 2, 1877, box 3, Subseries: Originals, 1830–1892, Theophilus A. Wylie Papers, Indiana University Archives, Bloomington, Indiana (hereafter T. A. Wylie Papers).

Wylie House, c. 1965
The Wylie House Museum is home to T. A. Wylie's personal collection of about seven hundred books
Courtesy, Indiana University Archives

should be a vehicle to further the curriculum. Some of the same interests are evident in his personal library. His engagement with his own books reflects a particular interest in the organization and teaching of science on both a national and international level.

The sources for determining the books contained in Wylie's two libraries are varied. The Wylie House Museum preserves all of the remaining books from his personal library. The sources for the Indiana University library are more complicated. The university library burned down twice, in 1854 and again in 1883. Very few records survive from that time, but some sources can help to show the kinds of topics that would have been represented in the library's collections. First, in 1842, Wylie published a *Catalogue of the Library of Indiana State University,* which Mildred Lowell, in her dissertation on the history of Indiana University libraries, describes as "the outstanding achievement of his regime as librarian."[6] Though Wylie probably would have had little influence in the selection of volumes listed in the 1842 catalog, since he had become librarian just one year earlier,

[6] Mildred Lowell, *Indiana University Libraries, 1829–1942* (Chicago, 1957), 43.

the catalog does represent the kind of library that he inherited. There also exist two lists of books that Wylie either purchased or received as gifts for the libraries. These lists are likely not the most representative sample of everything that Wylie acquired, but they are what survives and they may provide some indication of the books that Wylie procured for the university during his time as its librarian.

Wylie's personal collection contains 772 books.[7] Of those, there are 291 (38 percent) on religious topics, 205 (27 percent) on scientific themes, 168 (22 percent) on humanistic subjects, 68 (9 percent) on education, and 40 (5 percent) on other subjects. The preponderance of religious topics in Wylie's personal library makes sense, given that Wylie was a Presbyterian minister, and these books may well have been used in preparation for his sermons. More interesting, though, is the slight edge of science over humanities (though admittedly the percentages are relatively close). Based on the five years that Wylie was a professor of ancient languages, compared to the twenty-four years that he was a professor of natural philosophy and chemistry, one might expect to see a much higher percentage of scientific works. The near parity of science and the humanities might suggest that Wylie saw the humanities as highly relevant to studying the sciences or vice-versa. This evidence might also suggest that he considered the humanities (mostly dominated by classics) relevant to his work as a minister. Most likely, both of these suppositions are correct: Wylie probably used humanistic works both in his classes and in his work as a minister.

A more useful method for investigating Wylie's personal library is to look at the books he engaged with more thoroughly (see Table 1). Wylie annotated his books, and the ones that he annotated most heavily provide an interesting glimpse into the topics he thought about in more depth. From this brief list, one can detect a pattern. Many of the authors were well-known, highly regarded British scientists and science writers (Humphrey Lloyd, John Herschel, Charles Hutton, Dionysius Lardner); some were figures at the forefront of thinking in physics and astronomy (besides Herschel, the Americans Benjamin Peirce and Denison Olmsted). All of these nineteenth-century scientists were involved not only in scientific research, but also in scientific education and public organization. John

[7] Shawn Martin, "T. A. Wylie Library Dataset," *Wylie House Exhibits*, online at http://collections.libraries.indiana.edu/wyliehouse/items/show/32. The spreadsheet contains a full list of the books in Wylie's personal library along with graphs and categorizations of content used in this article.

Table 1: Theophilus A. Wylie's Annotated Books

Title	Year	Author
Elements of physics	1841	Neil Arnott and Isaac Hays
Eléméns de calcul différentiel et de calcul integral	1838	J. L. Boucharlat
Elementary treatise on mechanics	1825	John Farrar
Elements of chemistry: including applications of the science in the arts	1842	Thomas Graham
A preliminary discourse on the study of natural philosophy	1831	Sir John Frederick William Herschel
A treatise on astronomy	1864	Sir John Frederick William Herschel
Course of mathematics	1798	Charles Hutton
Elements of chemistry; theoretical and practical [. . .], vol. 2	1849	Robert Kane
Handbooks of natural philosophy and astronomy	1851	Dionysius Lardner
Lectures on the wave-theory of light	1841	Humphrey Lloyd
Treatise on astronomy	1879	Elias Loomis
Introduction to practical astronomy designed as a supplement to olmsted's astronomy [. . .]	1854	Ebenezer Porter Mason
Elementary treatise on curves, functions, and forces, vol. 2	1846	Benjamin Peirce
First principles of chemistry for the use of colleges and schools	1864	Benjamin Silliman
Treatise on astronomy	1871	Horatio N. Robinson

Herschel, for instance, was a leading light of British science through his experimental research, his methodological writings, his early leadership as a Cambridge undergraduate in the reform of British mathematics, and the foundation of the British Association. Humphrey Lloyd was one of the founders of the British Association (later the British Association for the Advancement of Science), and Neil Arnott went on to be one of the founders of the University of London. Thus, through his library, Wylie was connected to some of the centers of scientific thinking, particularly in Britain, and

was aware of the movement to create a new system for the organization and teaching of science. His interest is not surprising, since American professional scientific societies such as the American Association for the Advancement of Science and many universities were also undergoing significant changes during Wylie's lifetime.

The patterns found in Wylie's personal library stand in some contrast to his purchase of books for the Indiana University library. Mildred Lowell's analysis of the 1,445 volumes in the 1842 catalog found 141 titles contained in the two lists of purchases Wylie made for the university library. Using the same categories applied to Wylie's personal library, different patterns appear. The 1842 catalog contains 1,445 books: 127 (9 percent) on religion, 43 (3 percent) on science, 814 (58 percent) on humanities, 13 (1 percent) on education, and 403 (29 percent) on other topics (mostly reference and government documents). Wylie's purchases reflect similar trends but with some key differences. In the 102 books that were captured in the categories (for the remaining 39, I could not accurately identify titles or categories), 14 were on religion, 23 on science, 52 on humanities, and 13 on other (such as reference). In the library that Wylie cataloged in 1842, the humanities clearly dominated. Other works, mostly reference and government documents, are second, and science and religion combined comprise only 12 percent of the total. The books Wylie purchased show some similarities, most notably his emphasis on the humanities, but also demonstrate that, at least in this sample, Wylie purchased more works in the sciences during his tenure as librarian.

The question remains as to what these differences say both about Wylie as a scientist, and, more importantly, about his views on education and scholarship. Only one library report survives from Wylie's years as the university librarian. Wylie spends roughly a third of the one-page document discussing the curriculum. He states: "It might be suggested that since the Latin and Greek languages, to say nothing about their utility in disciplining the mind, enter so largely into scientific nomenclature, that the candidates for the degree of 'bachelor of science' be required to attend the classical studies of the preparatory department."[8] Wylie goes on to complain that students were not returning books, and to give some figures for the library budget. Clearly, at least in Wylie's mind, issues of the curriculum and the university library were connected.

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[8] Library Committee Report, 1865, item 44, box 4, Subseries: General, 1838–1888, Series: Administrative Files, 1831–1888, T. A. Wylie Papers.

Maxwell Hall Library Reading Room, Indiana University, Bloomington, c. 1903
Courtesy, Indiana University Archives

How might these two libraries (university and personal) have come together, at least in Wylie's mind? In a lecture from 1878 called "On Books and Libraries," Wylie leaves some important clues. Paraphrasing Francis Bacon, he suggests that "some books we must appreciate and digest, others consult . . . A library [is] like a dictionary for consultation." For Wylie, libraries were places to find facts and information, not sites for more in-depth research. Wylie continued: "It is not the number of books that make the scholar. We sometimes think we know what we have in our books. This is a mistake. We must make knowledge a piece of our minds." Knowledge must become a part of the person and live in their memories, not in a large, unused collection of books. What underlies all research, according to Wylie, is "the character of the book, more important than form or material."[9] For Wylie, the principles, or the philosophy, of the content are of primary importance. In order to understand what these principles were, one has to understand his underlying philosophy of education and scientific research.

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[9] Books and Libraries, January 11, 1878, item 71, box 5, Subseries: By subject, 1830–1891, Series: Sermons, lectures and public addresses 1835–1891, T. A. Wylie Papers.

The Purpose of Science and Education

It might be useful to compare Wylie to J. Lawrence Smith, who held strong, fairly typical, views on the future of science and universities. Smith stood as a critic of higher education: "Our universities (or rather our so-called universities) are too numerous . . . It would be far better to have fewer scientific schools."[10] In part, his criticism concerned quality of education, and thus Smith advocated for better scientific research that should ultimately produce practical results and serve the needs of industry. Smith contended that "abstract scientific ideas . . . underlie in these modern days, all discoveries conducive to man's progress," but he also insisted that these abstract ideas must not be philosophically based: "Any chemist who would quit his method of investigation, of marking every foot of his advance by some indelible imprint, and go back to the speculations of Albertus Magnus, Roger Bacon, and other alchemists of former ages, would soon be dropped from the list of chemists and ranked with dreamers and speculators."[11]

Wylie, on the other hand, argued that science served a higher purpose. In an undated talk, "On Education," Wylie criticized those who emphasized "practical arts" (which might include industry) and denigrated people who "are unable to go beyond first rudiments of knowledge . . . endeavoring to develop powers of the mind which nature has not given them. For them something preeminently practical, which a machine might do—which can be done with the hands and without the brains is certainly best. It is nearly the same too with respect to those whose sole object is to make money."[12] Rather, Wylie argued, "The object of education is the development of the mind, the drawing out of its powers, the preparing it for acting most efficiently in the proper time and place."[13] He defined the mind as an "intelligent principle within the body [which] uses the body as its instrument and is connected with the world of matter," a definition that suggests Wylie's penchant for philosophical musings.[14]

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[10] Frederick W. Putnam, ed, *Proceedings of the American Association for the Advancement of Science.* (Salem, Mass., 1873), 3.

[11] Putnam, *Proceedings of the American Association for the Advancement of Science*, 18.

[12] Education, undated, item 27, box 6, Series: Sermons, lectures and public addresses 1835–1891, T. A. Wylie Papers.

[13] Ibid.

[14] Theophilus A Wylie, "The Connection of the Mind with the Material World," *Current* vol. 6, no. 133 (July 1886), 89–90.

Wylie's philosophical proclivities demonstrate the second, and perhaps more important, difference between his ideas and Smith's. Wylie devoted entire sermons to the intersections of science and religion. In an 1850 letter to John Fries Frazer about some experiments Wylie was performing on gold, he speculated on the origins of metal "at the creation in which I reconciled geology & scripture and starting out with La Place's nebular hypothesis and Dr. [Joseph] Black's theory of latent heat.... This overcrowding the solar system with so many planes as has been done these few years past, would hardly correspond with my cosmogony."[15] Wylie never abandoned such speculations, writing in his diary in 1873 that "the great mass of evidence, laid open to our view in the study of nature accords with divine book on which his hope of immortality rests.... future discoveries will make all things plain, and add further evidence to its truth."[16] In Wylie's thought, the purpose of science was not industrial application, but further understanding of divine revelation.

Wylie and Smith's differences were not limited to philosophy and industry. The two men differed tremendously on the importance of teaching. Smith insisted that teaching "unfits [one] for that free exercise of the mind which leads to new ideas and discoveries. He becomes an educational drudge instead of an intellectual scientist,"[17] In fact, Smith later left his employment at a university to become a scientist at the Louisville Gas Works. Wylie, on the other hand, had recognized his ability to teach in his mid-twenties. In his diary he wrote, "Teaching comes quite natural to me. I fear that it will be the trade into which I will eventually sink."[18] Forty years later, after teaching at Indiana University for many of those years, Wylie's students wrote that his "proficiency in his department, his eagerness, willingness, and energy, with which he instructs his classes leads us to say, none are like him, and none could fill his position as well as he."[19]

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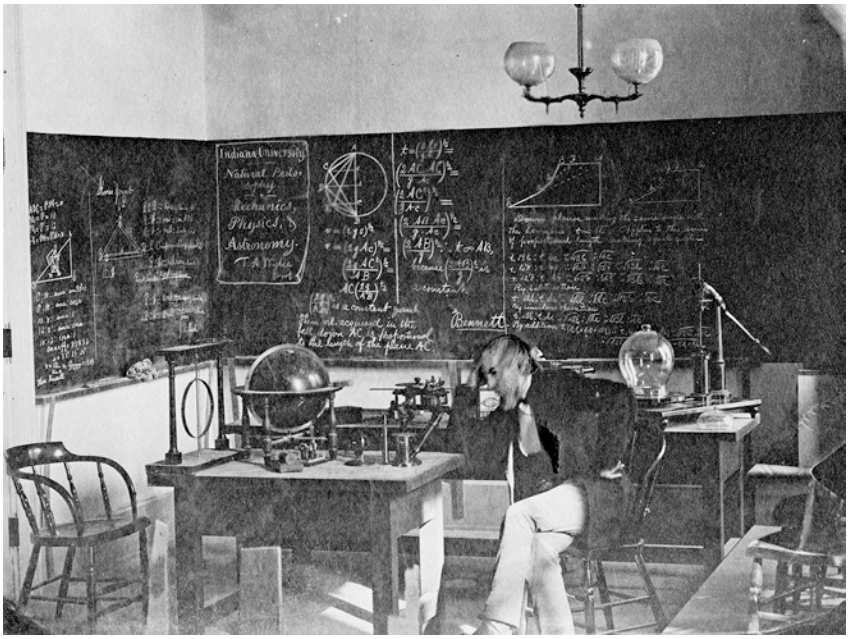
[15] Letter to John Fries Frazer, July 10, 1850, item 2, Theophilus Adam Wylie Letters, Rare Books and Manuscripts, S1469, Indiana State Library, Indianapolis.

[16] Diaries, c. 1873, p. 207, Folder: May 21, 1865-March 16, 1873, box 3, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

[17] Putnam, *Proceedings of the American Association for the Advancement of Science*, p. 4.

[18] Diaries, May 31, 1836, p. 113, Folder: February 27, 1836-February 18, 1836, box 2, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

[19] Beta Theta Pi Fraternity, "Rev. T. A. Wylie, D.D.," *The Dagger* 1 (1878), 2.



Theophilus Wylie in his classroom for Natural Philosophy, Mechanics, Physics, and Astronomy, January 1, 1876
Wylie served as a faculty member in natural philosophy, chemistry, and ancient languages.
Courtesy, Indiana University Archives

Wylie's interest in teaching also extended beyond the classroom to his publication activities. In his lifetime, J. Lawrence Smith published about 145 articles, mostly in journals intended for other scholars.[20] Wylie's publication strategy was very different. Altogether, he published just twelve items (see Table 2). The *Catalogue of the Library of Indiana State University* (1842) is not attributed to Wylie but is likely his work.[21] Four of the articles were distributed in scientific journals (*American Journal of Science*, *Journal of the Franklin Institute*, *Proceedings of the American Philosophical Society*, and the *Monthly Notices of the Royal Astronomical Society*). The rest of Wylie's publications comprise newspaper articles (*Indianapolis Journal*),

[20] Benjamin Silliman, *Sketch of the Life and Scientific Work of Dr. John Lawrence Smith: Prepared by Appointment of the National Academy of Sciences* (Washington, D.C., 1884), 23–82.

[21] Lowell, *Indiana University Libraries, 1829–1942*, 43.

Table 2: Theophilus A. Wylie's Publications

Title	Year
Catalogue of the Library of Indiana State University	1842
Letter on gold found in Indiana read by Prof. John Frazer, *Journal of the Franklin Institute*	1850
Letter on gold found in Indiana read by Prof. John Frazer, *Proceedings of the American Philosophical Society*	1850
"Teeth and Bones of Elphas Primogenius, Lately Found Near the Western Fork of the White River in Monroe County, Indiana," in *American Journal of Science*	1859
Baccalaureate Discourse to the Graduating Class of Indiana State University	1859
"Andrew Wylie, D. D., First President of Indiana University," in *Indiana School Journal*	1869
"The Meteors of November 13–14, 1867 observed at Bloomington, Indiana" in *Monthly Notices of the Royal Astronomical Society*, published by Daniel Kirkwood and mentions Wylie as a contributor	1867
"Interesting Report of Prof. Wylie of the State University," in *Indianapolis Journal*	1869
"Rain of Spider-Webs," in *Scientific American*	1881
"The Connection of the Mind with the Material World," in *The Current*	1886
"Hoosierisms," in *The Current*	1886
Indiana University: Its History from 1820, when Founded to 1890	1891

articles in popular literary (*The Current*) and scientific (*Scientific American*) magazines, and pieces in educational newsletters (*Indiana School Journal*). Additionally, Wylie published one of his baccalaureate addresses, and the work for which he is best known, *Indiana University: Its History*.

Overall, Wylie placed far more emphasis on preaching and teaching than on publishing. Only four out of his twelve published articles were intended for fellow scientists. The rest were written for the general public. Perhaps Wylie saw sharing knowledge as a public duty, and in order to understand why he may have felt this way, one needs to understand his overall view of natural philosophy.

Natural Philosophy

What is "natural philosophy" and what makes it different from other branches of science? Perhaps more importantly, what made the nineteenth-century study of natural philosophy different from the study of other disciplines, such as physics? In the case of Indiana University, it is possible to trace the exact moment when the institution made a distinction between natural philosophy and physics. Beginning in 1867, Wylie was the chair in natural philosophy; in 1884, for the first time, the university catalog listed him as both chair in natural philosophy and professor of physics. In 1886, the year he retired, Wylie was named professor emeritus of physics, a title he continued to use until his death. These changes in title present an opportunity to think about how Wylie, both a natural philosopher and physicist, defined the boundaries of the disciplines in which he held positions.

For Wylie, science, religion, and education were inseparable from each other and imperative for higher education. In an 1878 sermon, Wylie made an oblique reference to people who might be termed physicists, "the great students and thinkers who have made such advances in knowledge and in the explanation of things, particularly those connected with matter and force," who have "proposed their speculations and hypotheses as if they were established truths and worthy of all acceptation." In the same sermon, Wylie defined speculation as "the respect to the origin and causes of things."[22] For Wylie, the concepts of speculation and origin were keys to how he understood the connection between science, religion, and education.

In 1909, Arthur Foley, in an address to the Indiana Academy of Science, would define physics as "an exact science whose fundamental principles had been discovered and its laws expressed by equations."[23] Wylie countered this kind of thinking, saying that "We think we know something about the effects of forces, but of forces in their origin and in their various manifestations . . . we know little or nothing."[24] Wylie emphasized the importance of determining origins for science; for him, God was the ultimate origin, the divine authority helping to rein in dangerous speculations. Education, then, could help others (including students) to

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[22] Truth, 1878, box 5, Subseries: By subject, 1830–1891, Series: Sermons, lectures and public addresses 1835–1891, T. A. Wylie Papers.

[23] Arthur A. Foley, "Recent Progress in Physics," *Proceedings of the Indiana Academy of Science* (Indianapolis, Ind., 1909), 92.

[24] Truth, 1878, T. A. Wylie Papers.

bring together science and religion. This manner of tying together science, religion, and education also becomes apparent in an address Wylie gave about Darwin's ideas on evolution.

Wylie's beliefs were certainly not unusual in the nineteenth century. William Whewell had proposed a kind of natural theology in which science helped to demonstrate humanity's unique place in the world.[25] Wylie may have agreed with some of Whewell's arguments, yet he would likely have differed in some fundamental ways, particularly regarding physics. According to R. R. Ramsey in his overview of early physics at Indiana University, "professors of natural philosophy seemed to be those who taught Mathematics, Physics, Chemistry, Astronomy, and perhaps Botany and Zoology."[26] Jed Buchwald and Sungook Hong argue that in the late nineteenth century, before physics became a quantitative discipline that differed markedly from astronomy, chemistry, and mathematics, there were four distinct areas of natural philosophy—including "mechanical history," whose practitioners focused on the ways that forces exerted themselves in disciplines like astronomy, mechanics, hydraulics, chemistry, and others. Buchwald and Hong contrast this kind of physics, tied to natural philosophy, with the experimental and applied field that became modern physics.[27]

In an 1841 diary entry, Wylie suggested the kinds of research that interested him: "Yesterday thought of a good subject for an essay.—viz. Mechanics, not philosophical, but social & religious. Explain the mechanism of society & of churches.—perhaps we might find several mechanical powers analogous to those in physics, by which the mechanical operations of the social religious & political systems are carried on."[28] In this passage, one can see various strands of thought. Wylie was interested in bringing together scientific and religious ideas, but not as a natural scientist, but rather as a "mechanical historian." Wylie was interested in force and how it applied both to science and to social systems, most notably religion. This early interest seems to have remained with him in various ways until the end of his time at Indiana University.

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[25] Richard Yeo, "William Whewell, natural theology and the philosophy of science in mid nineteenth century Britain," *Annals of Science* 36 (1979), 493–516.

[26] R. R. Ramsey, "Early Physics in Indiana (to 1900)," *Proceedings of the Indiana Academy of Science* 58 (1947), 253.

[27] Jed Z. Buchwald and Sungook Hong, "Physics," in *From Natural Philosophy to the Sciences: Writing the History of Nineteenth-Century Science,* edited by David Cahan (Chicago, 2003), 167.

[28] Diaries, January 23, 1841, p. 58, Folder: July 22, 1838-January 14, 1844, box 3, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

For Wylie, trying to separate the boundaries between science and religion was an almost impossible task. In his mind, the two were inextricably bound. Wylie was particularly critical of a kind of zealousness in science: "It is well known that many men eminent for their scientific knowledge … seem zealous in the efforts to make the revelations of science contradict the word of God." Wylie's critique is more nuanced, however, than a dislike of science contradicting religion. He also suggested that some scientists were attempting to make their field into an alternative religion: "They are not contented with the candid presentation of what seems to be the truth and our deductions of that truth.... they seem to take pleasure in their attempt to make science the foundation of that religion which has cheered so many in life and at death."[29] In Wylie's view, these men were dangerous, "their investigations and speculations boldly entering where even angels fear to tread and elated with their real victories insist on their guesses and speculations and hypotheses of equal value with demonstrated truths."[30] Pointing to the "demonstrated truths" of religion, he also suggested that scientists were engaged in "guesses, speculations, and hypotheses" that did not necessarily carry the same weight.

One of the ways that Wylie spoke about the limitations of scientific speculation was by discussing the restrictions of language itself, particularly because he believed that language pointed not to fact, but rather to the appearance of fact. Wylie used the example of astronomy, because "learned and truth loving astronomers use language which does not exactly represent facts but appearances."[31] In a lecture on astronomy, Wylie went even further, discussing how science (in this case, understanding the motion of the earth and stars) forces humans to believe something that they cannot perceive. As Wylie put it, "Astronomy teaches, nay compels us to believe strange as it may seem all who have studied this subject believe implicitly—yet as certainly as they do in their very existence in all things, things which astronomy teaches though they are so flatly contradicted by our senses."[32] Humans cannot actually feel the earth moving, but believe

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[29] God of Nature and God of Revelation, 1871, box 6, Subseries: By subject, 1830–1891, Series: Sermons, lectures and public addresses 1835–1891, T. A. Wylie Papers.

[30] Truth, 1878, T. A. Wylie Papers.

[31] God of Nature and God of Revelation, 1871, T. A. Wylie Papers.

[32] Astronomy Lecture Before the Teacher's Institute, August 1874, box 5, Subseries: By subject, 1830–1891, Series: Sermons, lectures and public addresses 1835–1891, T. A. Wylie Papers.

it, because science teaches them that it does and because it makes sense when combined with other known truths.

In the same way, Wylie argued that, when trying to understand the ultimate origins of the universe, science had limits: "We are aware that infinity and eternity are words expressive of ideas which the human mind can not grasp" and during the first moment of the universe coming into existence "no human mind was witness to the events."[33] In his diaries, Wylie contended with specific ways of thinking about the origins of scientific truths, complaining that "scientists such as Tyndall Et alii, could trace matter to its atoms & vertices, but with regard to the origin of these they had nothing to say."[34] In 1873, Wylie even went through a rather convoluted thought experiment on "cosmogony" in which he posited, "By the term matter we suppose is meant the elements or atoms of all things now existing, which for many reasons we imagine were created in a gaseous form.... But do we not see that the most sublime calculations of the mathematician, have their origin in the limit or limiting ratio of a finite quantity made equal to nothing?" He concluded:

> Thus the particles of matter for we are not supposed them yet to have received the property of attraction may have been scattered through the immensity of space, every atom having a separate existence and altogether unconnected with any other of a different kind, and considering this gaseous form of matter to have been the most simple and having taken it as a principle that God in his works employs the most simple and direct methods, we would be inclined to believe that matter would have this gaseous form when first called into existence.[35]

Overall, Wylie seems to be arguing for a gaseous origin of matter, because God employed only the simplest methods.

Wylie also placed boundaries on religious methods of interpretation. In an 1871 sermons, he stated that "the laws of nature man can discover

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[33] God of Nature and God of Revelation, 1871, T. A. Wylie Papers.

[34] Diaries, December 11, 1887, p. 148, Folder: September 13, 1885-October 7, 1888, box 3, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

[35] Diaries, a. 1873, p. 210, Folder: May 21, 1865-March 16, 1873, box 3, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

without a supernatural revelation."[36] Some of his diary entries affirm his conviction that "no one regards the Bible as a book to teach us geology or any other science"[37] and that "there may I think be some ground for not taking the physical facts as mentioned in the Bible, as literally true or laying much any stress on them, as correct exponent of physical truth."[38] Wylie also argued that "God never intended that the Bible should teach us science. Its great object is to show man his moral condition.... to enable man to know himself and to understand the relation in which he stands to God."[39]

Despite his view of the limitations of biblical truth, Wylie still struggled with how to reconcile biblical and scientific teachings. Attempting to understand the origins of the universe, he wrote of "God's other book, the book of nature.... God, the God of truth would not say one thing in his word and a different thing in his works."[40] Wylie also appealed to humanity's ultimate inability to understand the universe: "the great students and thinkers ... altogether forget that while their sphere of knowledge increases, the larger sphere of the unknown always surrounds it." "There are," he noted, "some very considerable differences between God and Man—Man is limited on ever side his view partial and incomplete."[41] Finally, according to Wylie, because humans were unable to understand fully the mysteries of the universe, they must submit to the ultimate arbiter of truth, God: "So it is with regard to our belief in the insistence and character of the supreme being—This belief lies at the very foundation of moral character and correct principles."[42] The key to religious learning, Wylie pointed out, was morality.

Wylie often seemed obsessed with moral character. In his sermons, he warned that people were "living according to depraved nature. Human nature needs restraint. Neither so plainly taught by reason."[43] Linked with

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[36] God of Nature and God of Revelation, 1871, T. A. Wylie Papers.

[37] Diaries, February 16, 1890, p. 42, Folder: October 6, 1889-July 1892, box 3, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

[38] Diaries, December 11, 1887, p. 149, Folder: September 13, 1885-October 7, 1888, box 3, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

[39] God of Nature and God of Revelation," 1871, T. A. Wylie Papers.

[40] Ibid.

[41] Truth, 1878, T. A. Wylie Papers.

[42] Ibid.

[43] Science and Religion, undated, box 6, Subseries: By subject, 1830–1891, Series: Sermons, lectures and public addresses 1835–1891, T. A. Wylie Papers.

his insistence on morality was Wylie's fear of atheism, which he considered a fundamental flaw in many scientists: "If men are made to believe that there is no God, if atheism prevails, what check is there on the passions of men."[44] Ultimately, although Wylie was open to scientific claims, he held "all truth not equally important," and insisted that the "most important truth [was] Gospel Truth"[45] The Bible exerted a "civilizing influence [which] has been working since the commencement of the Xtian era. The rights of man are better understood & national questions are not yet settled by arbitration but they soon will be.... The gospel is now reached in nearly all lands—but there is still quantity of rascality & diabolic wickedness to be crushed out."[46] Morality was key to checking the atheism that science might allow and avoiding the harm it could bring if human passions remained unchecked.

Education, therefore, for Wylie, was an extremely important process that combined both science and religion. In all of the many talks Wylie gave about education, he stressed that the purpose of education was primarily "the development of the mind, the drawing out of its powers, the preparing it for acting most efficiently in the proper time and place."[47] Wylie emphasized that education provided students with a group of tools to use, along with the moral guidance that was essential in attaining the wisdom to use those tools effectively.

Wylie made these points especially clear in his 1859 IU baccalaureate address: "Learning or knowledge is like a stock of goods, and wisdom the ability to arrange and display it, and dispose of it. In education it is of importance to acquire the stock of ideas, but of more importance to acquire skill in the arrangement of them." This skill, Wylie argued, could be gained through wisdom, which helped the student "avoid the dangers and grapple successfully with the difficulties and dangers he may meet in life. The wise man readily perceives the relations of things, 'Wisdom' indeed consists in the choice of proper ends and means."[48] In other addresses on

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[44] Truth, 1878, T. A. Wylie Papers.

[45] The Truth, undated, box 6, Subseries: By subject, 1830–1891, Series: Sermons, lectures and public addresses 1835–1891, T. A. Wylie Papers.

[46] Diaries, February 16, 1890, p. 42, Folder: October 6, 1889-July 3, 1892, box 3, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

[47] Education, undated, T. A. Wylie Papers.

[48] Theophilus A. Wylie, *Baccalaureate Discourse to the Graduating Class of the Indiana State University* (Indianapolis, Ind., 1859).

education, Wylie clarified some of these points and suggested that "the principal aim of a teacher in the discharge of his duties . . . is not the main object to furnish the pupil with a stock of knowledge." Wisdom came from "the development of the moral powers."[49] He even went so far as to wonder if "positions of atheistic teachers are tenable."[50] For Wylie, morality and natural learning were inextricably encompassed within the exercise of teaching.

It was in his sermons to IU students that Wylie most clearly attempted to bring science and religion within the same boundaries. In an 1866 sermon given in the College Chapel on the topic of evolution, Wylie discussed the limitations of scientific practice. He showed a clear desire to determine the ultimate origins or causes of natural phenomena, and he tried to provide moral guidance for his listeners.

Wylie began with three points: evolution was "not inconsistent with teleology . . . does not necessarily lead to atheism. . . .[and] is not inconsistent with revelation." He made clear that he was not against Darwin's ideas explicitly. At the same time, Wylie insisted that science had limitations: "We know nothing and can conceive of nothing in the material world that can originate life. For its origin we will have to look we think beyond the domain of merely physical laws."[51] The origin and the final cause still remained with God, and God offered not only an explanation of origins but also a moral compass. Wylie concluded his remarks by saying that "in the economy of the gospel, this true holiness of character is as it were the special gift of God the Holy Spirit."[52] He sought to educate his listeners about the ways in which they could understand and use evolution in relation to the revealed word of God.

What do all of these interrelations between science, religion, education, and evolution have to do with natural philosophy or physics? Between 1884 and 1886, Theophilus Wylie added the title of professor of physics to his job as a professor of natural philosophy. In his early career, Wylie had seemed to be interested in "mechanical history." Now nearing the end of his career, Wylie still did not depart significantly from his earlier desires to understand how mechanical history could be applied to wider

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[49] Education, undated, T. A. Wylie Papers.

[50] Truth, 1878, T. A. Wylie Papers.

[51] Evolution, 1866, box 5, Subseries: By subject, 1830–1891, Series: Sermons, lectures and public addresses 1835–1891, T. A. Wylie Papers.

[52] Ibid.

issues like religion. Despite the change in his title, Wylie failed to reflect upon all of the broader changes in the discipline of physics.

This discrepancy was noticed by Wylie's own students. In *The Dagger*, a student publication rating professors and commenting on university news, one rather scathing critique of Wylie commented that he "knows almost nothing outside of physics and astronomy, and in these even is forty years behind the time.... It is unnecessary to add that this incubus should be removed from the chair of Physics."[53] While one hesitates to put too much credence in the writings of a single student, this critique does suggest that the older Wylie was seen by at least some of his students as out of sync with the changing times.

Wylie, it seems, remained a natural philosopher. For him, the highest task of a scholar was to find the ultimate origins of the forces acting upon the universe, and he believed those forces to be controlled by God, who was the ultimate cause. Yet Wylie also recognized the importance of observed phenomena in explaining ultimate causes. Additionally, Wylie considered it essential for his students to be "wise" and moral people who could utilize the tools of both science and religion to understand the ever increasing mysteries of nature. Though the discipline of physics had changed significantly, Wylie did not. In his diary only a few years before he died, Wylie wrote: "There is a great (first) cause—intelligent—Nature, the developer by which quoting Isaiah—the way will be prepared. Prepare ye Way of the Lord, make straight in the desert a highway for our God, &c. This is what science is doing."[54]

Theophilus A. Wylie's clear emphasis on natural philosophy, as he defined it, separates him from the ideas of more prominent figures in science and higher education such as J. Lawrence Smith. During the mid-to late nineteenth century, the dominant model for higher education—Smith's ideal—was a university tied to industrial needs, where faculty were not required to teach (or were expected to do little of it), and where universities were separated from the need to inculcate moral and religious principles.

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[53] Beta Theta Pi Fraternity, "Wylie" *The Dagger,* 1 (1880), 4.

[54] Diaries, May 11, 1890, p. 58, Folder: October 6, 1889–July 1892, box 3, Subseries: Originals, 1830–1892, T. A. Wylie Papers.

The model of higher education that the United States had imported from Germany was built fundamentally to create professionals needed for the state—bureaucrats and other clerical workers.[55] The concept of *bildung*, or the Romantic ideal of knowledge for its own sake, was often used to elevate the professional status of professors themselves, who in previous centuries had been devoted to staffing the ranks of professional clergy and, at least theoretically, to understanding God.

In the United States, arguably, a fundamental difference arose regarding the kinds of professionals that the universities were creating. Rather than trying to make future bureaucrats or future ministers (though admittedly many universities were doing that too), they *de facto* began making future managers and workers for industry and business. Professional scholarship, despite its rhetoric of disinterested knowledge pursued for its own sake, was actually meant to serve industry and the needs of the business sector.

Theophilus A. Wylie, in contrast, saw a clear relationship between his research interests, linking science, religion, and natural philosophy into an educational mission that he disseminated both to his students and to the wider public. As Indiana University became a research-oriented institution under the leadership of David Starr Jordan and later presidents, Wylie remained an exemplar of a professor navigating his career via an alternate model of scholarship and teaching.

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[55] Lenore O'Boyle, "Learning for its Own Sake: The German University as Nineteenth-Century Model," *Comparative Studies in Society and History* 25 (1983), 3–25.