

### *Correspondent Enthusiasts*

We provide some details about the lives and careers of six leading mathematical enthusiasts who posed and solved problems in *The Mathematical Correspondent*.

**William Lenhart** (1787-1840) was strongly influenced by *The Correspondent* as a teenager. That he achieved such success was pure serendipity, because his farming parents did not believe in education, so he was thirteen by the time he was allowed to attend school. How fortunate that his hometown York County Academy was run by Robert Adrain! Although Lenhart's father withdrew his son after eighteen months—thus ending his only formal education—his talents were obvious to Adrain, who, at that time, was an unknown quantity. Therefore, the younger Lenhart was a 17-year-old farm boy when he first solved problems in the fledgling journal. One can conclude from his listed addresses that in early 1805 he moved from York to Baltimore, where he was employed, in his words, “selling knob-locks and butt-hinges.”<sup>1</sup> This is where he resided when he won a Baron prize for solving the hardest problem in that issue, the most prestigious award that existed for mathematics at that time. Lenhart never held an academic position. In 1812, a spill from a carriage resulted in a broken leg and spinal injuries so severe that he was disabled for the rest of his life. He did not engage in mathematics for the next 13 years until his mentor, Robert Adrain, convinced him to contribute to his latest journal, the *Mathematical Diary*. Lenhart openly admitted that his taste for mathematics was restricted to “old fashioned pure Geometry and the Diophantine Analysis,” yet the historian of mathematics Florian Cajori listed him among “the more prominent mathematicians of America.”<sup>2</sup> One can only wonder what Lenhart might have accomplished if not for the tragedy that befell him.

**Robert Maskell Patterson** (1787-1854) was another young active problemist who was deeply influenced by *The Correspondent*. But his educational opportunities contrasted sharply with Lenhart's, as his father Robert Patterson had been professor of mathematics at Penn since 1779. What an exciting time in the life of the younger Patterson—he graduated from Penn in 1804 shortly after Meriwether Lewis had traveled to Philadelphia to study global positioning with his father. Upon graduation the younger Patterson enrolled in the country's first medical school at Penn. This means that he posed two problems and solved eleven others while pursuing the M.D. degree he obtained in 1808. After studying in Europe for three years, he held chairs at Penn and Virginia. The elder Patterson subscribed to the *Mathematical Correspondent* but did not otherwise participate, although he did contribute vigorously to other successor journals.

Robert Patterson was appointed vice-provost at Penn in 1814, when his son succeeded him as professor of mathematics.

Many *Correspondent* problem solvers attained considerable recognition in other fields; we single out four of these mathematical enthusiasts to indicate some of the obstacles these early Americans faced. **Walter Folger, Jr.** (1765-1849) spent his entire life on the island of Nantucket, attending only elementary school but educating himself sufficiently in mathematics and science (as well as French) to stay in touch with major developments on the mainland. At age 23 he constructed “Folger’s astronomic clock” that designated the time, day, and year, showed the paths of the sun and moon, and demonstrated various other planetary phenomena. Subsequently he acted as a land surveyor, constructed several telescopes, and wrote an almanac, all of which made use of his knowledge of mathematics. Next came a brief detour into medicine but then he switched to law for the rest of his life. It was during this time that he proposed one problem in the *Mathematical Correspondent*, solved eleven, and requested that George Baron republish a British account of differential calculus. This attests not only to the efficacy of Folger’s self-education but his farsightedness, since the American edition of the Rev. Samuel Vince’s book, *The Principles of Fluxions*, became one of the first calculus texts adapted for American colleges when it appeared in 1812.

However, election to a one-year term in the Massachusetts legislature and a five-year term in the state senate put an end to all of Folger’s scientific pursuits except solutions of mathematics problems, which he continued to submit to various newspapers and scientific journals in spite of judicial obligations (ultimately he became chief justice of the Court of Common Pleas) and family demands (he had ten children).

We state four results taken from pages 136-138 of Samuel Vince’s article in the *Mathematical Correspondent*:

PROP. III: If the fluxion of  $x$  be denoted  $\dot{x}$ , the fluxion of  $ax$  will be  $a\dot{x}$ .

PROP. IV: The fluxion of  $x \pm a$  is  $\dot{x}$

PROP. V: Given  $(\dot{x})$  the fluxion of  $x$ , to find the fluxion of  $x^n$ ,  $n$  being a whole number.

PROP. VI: To find the fluxion of  $x^{\frac{n}{m}}$ ,  $m$  and  $n$  being a whole number.

A reader with knowledge of first-semester calculus should recognize these results, though probably not in this form, and should be able to complete Propositions V and VI. In the discussion that followed these results, Vince supplied proofs using the definition of a fluxion as a

limiting ratio. For Proposition V he concluded, “Therefore  $nx^{n-1}\dot{x}$  represents the cotemporary fluxion of  $x^n$ .” Using this as a guide, can that reader deduce the form of Vince’s conclusion to Proposition VI?<sup>3</sup>

Another contributor to the problems section in the *Mathematical Correspondent* was **Enoch Lewis** (1776-1856). Lewis lived in Philadelphia and its environs, so he was geographically closer to other scientists than Folger, yet his daily duties allotted little time for original investigations. Lewis ended his formal education by age 15, when he became master of the school he attended. Imagine being principal of a school at such a tender age today! In 1795 he traveled to western Pennsylvania under Andrew Ellicott, regarded as the country’s foremost astronomical surveyor, and when the survey was completed one year later, he returned to Philadelphia as a mathematics teacher at the Friends Academy. In 1799 he moved to the newly opened Westtown Boarding School, located about twenty miles west of the city. In addition to teaching duties, he found it necessary to engage in farming to support his fifteen children. Nonetheless, he was able to submit correct solutions to ten of the eleven problems in one issue of the *Correspondent*.

The Westtown Boarding School bore ripe fruit in one of its students, **John Gummere** (1784-1845). He attended country schools but, unhappy with the instruction, taught himself algebra, geometry, trigonometry, surveying, and astronomy. At age 19 he began a career as a teacher, but stopped the next year to study in Westtown under Enoch Lewis for six months. He then resumed teaching in Burlington, NJ, where he resided when he submitted solutions to problems in the *Correspondent*. Gummere’s papers on astronomy in the *Transactions* and the *Memoirs* led to his election to membership in the American Philosophical Society. He also wrote the book *A treatise on surveying* (1814), which went through 22 editions, and *Elementary treatise on astronomy* (1822), which was adopted at several colleges, including West Point. As a result of these publications, John Gummere should be regarded as a mathematical practitioner, not just an enthusiast. In 1833 he was appointed the first mathematics professor at the newly opened Haverford College.

Our final enthusiast, **John Eberle** (1787-1838), was schooled at home in Lancaster, where he did not speak English until age 12, and even that was a dialect called Pennsylvania Dutch. Yet his informal education enabled him to study medicine in Lancaster before enrolling in medical school at the University of Pennsylvania in 1806. This means that Eberle was farming

by day and studying by night when he proposed and solved problems in the *Correspondent*. Later, he served as an army surgeon during the War of 1812. When hostilities ceased, he moved to Philadelphia, where ten years later, in 1824, he and two other physicians founded Jefferson Medical College.

### Endnotes:

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<sup>1</sup> On p. 413 of S. Tyler, Life of Lenhart the mathematician, *Biblical Repertory and Princeton Review* **13** (1841) 394–416.

<sup>2</sup> On p. 95 of Cajori, Florian Cajori, *The Teaching and History of Mathematics in the United States*, Government Printing Office, Washington, DC, 1890.

<sup>3</sup> He wrote, “ $\frac{n}{m} \times x^{\frac{n}{m}-1} \dot{x}$  represents the cotemporary fluxion of  $x^{\frac{n}{m}}$ ”.