Benjamin F. Finkel 1865-1947

By V. Frederick Rickey

Benjamin Franklin Finkel was born July 5, 1865 on a farm near East Ringgold, Ohio, about 40 miles SSE of Columbus. He attended the Ridge country school in Fairfield County, where "disorder reigned



supreme" until a new teacher, R. V. Allen, used his muscle to subdue the older boys. Later, when Finkel was fifteen, he encountered a "very superior country school teacher," George W. Bates, who had more influence on him than anyone else besides his mother. "Though small in stature and crippled in limb," Bates was a man of courage, honesty, firmness, and judgment, who strove to instill these character traits in his students. It was at this time that Finkel's interest in mathematics was aroused. A problem had been making the rounds, and Finkel's older half-brother¹ heard it at the village store, and brought it home:

There is a ball 12 feet in diameter on top of a pole 60 feet high. On the ball stands a man whose eye is six feet above the ball. How much ground beneath the ball is invisible to him?

Finkel asked his teacher, Bates, about the problem, who explained that it might be solved by geometry. But since Finkel saw neither an algebra nor a geometry book till he was seventeen, this advice was of little help. He had studied *Ray's Third Part Arithmetic*,² so attempted to solve it using the rules of mensuration in that book. It was several years before he succeeded, but a prob-

lem solver was born. In 1931, Finkel reminisced that

this perfectly senseless problem, with no value whatsoever from the standpoint of modern educational theory, nevertheless was the borax in the mortar which retarded mental hardening until a time arrived when other elements could play their part in the active materials of a life, and it seems to me that such a result should be the test by which the value of a problem should be gauged. [Finkel, 1931, p. 307]³

¹ His mother, Louisa Frederica Stickle (1829-1926), was born in Württemberg, Germany, and married a Mr. Kibler or Kebler. They immigrated to America about 1853. When he died, she married John Philip Finkel (1820-1898), a farmer. The halfbrother, Lewis Kebler, was born in 1858 or 1859. Benjamin Franklin Finkel was the second of their five children. Data from the 1880 US Census.

² We aren't sure which edition of this book Finkel had studied. For information about Joseph Ray, see David E. Kullman, "Joseph Ray The McGuffey of Mathematics," *Ohio Journal of School Mathematics*, No. 38 (1998), 5-10.

³ In 1931, when Finkel was 66 years old, the program committee invited him to speak at the annual MAA meeting in Cleveland. This was published in the *Monthly* later that year as "The Human Aspect in the Early History of the American Mathematical Monthly" [*AMM*, 1931, 305-320]. It is this paper that is the source of much of what has been written about him. We will have occasion to cite this paper frequently as so we do so as, e.g., [Finkel 1931, xxx]. References to the *Monthly* will be cited in the format [*AMM*, year, pages]. To the year, add 7, and you will have the volume number mod 100.

Finkel at Ohio Northern University, 1883-1884

In 1871, Henry Solomon Lehr founded Northwest Ohio Normal in Ada, Ohio, which the locals affectionately called "Old Normal." In 1875, North-West Ohio Normal School in Fostoria merged with it. In 1885, the trustees renamed the school Ohio Normal University and Commercial College. Financial difficulties forced Lehr to sell the school to the Methodist Church in 1899, and they renamed it Ohio Normal University. It acquired its current name — Ohio Northern University — in 1903.



ONU as pictured in the 1884-1885 Catalog.

Finkel writes [Finkel 1931, 307] that he suggested this name so we shall just use the name Ohio Northern University.

At age eighteen — that would have been 1883 — Finkel left the county school to attend Ohio Northern University in Ada. From the *Annual Catalog of the Teachers and Students of the North-Western Normal School and Business College for the School Year 1882-83 and Announcements for 1883-84* we know what the first year courses were.

The "First Fall Term" of ten weeks ran from August 7, 1883 until October 12. It is likely that Finkel would have taken the Scientific Course rather than the Teachers' Course. If so, the courses were

Arithmetic, Practical	Ray^4
Arithmetic, Mental	Stoddard ⁵
English Grammar	Harvey
Elocution and Voice Culture	Kidd
Descriptive Geography	Electic
Drills – Penmanship and Letter-Writing	

The "Second Fall Term" of ten weeks involved

Elementary Algebra	Ray ⁶
Analysis of Sentences	Green

⁴ Joseph Ray (1807-1855), who was the author of numerous mathematical textbooks, started teaching at Woodward College in Cincinnati in 1831 (which became Woodward High School in 1851) and remained there for the rest of his life. This work is most likely the 1877 edition of *Ray's New Practical Arithmetic*. The popular "One Thousandth Edition" of *Ray's Practical Arithmetic: by Induction and Analysis*, appeared in 1857.

⁵ John Fair Stoddard (1825-1873) was the author of several arithmetics that competed with those of Joseph Ray. The one used at Ohio Northern was probably an edition of his *American Intellectual Arithmetic*, first published in 1857.

⁶ *Ray's Algebra, Part First: on the analytic and inductive methods of instruction*, c1848.

Physical Geography	Houston
United States History	Electic
Elocution and Voice Culture	
Drills – Penmanship and Composition	

The "Winter Term" was also ten weeks, the courses were:

Arithmetic, Higher	Ray ⁷
Physiology	Cutter
Natural Philosophy	Norton ⁸
General History	Swinton
Algebra	Ray ⁹
Drills – Composition and Debating	2

The "Spring Term" was one week longer and consisted of:

Higher Arithmetic, completed	Ray
Higher Algebra	Ray ¹⁰
Botany	Wood
Natural Philosophy, completed	Norton
Drills – Composition and Debating	

Finally, there was the eight-week "Normal Term" going from May 22, 1884 to July 18:

Review of Common Branches	
Higher Algebra	Ray
Parliamentary Law	Roberts
Rhetoricals	

Besides this list of courses taught during the first year, a list of Finkel's grades in the courses he took are preserved in the handwritten grade ledgers at Ohio Northern. We give them here in full:

Arithmetic Higher "B"	95
Arithmetic Higher "A"	88
Grammar	80
Geography	94
U.S. History	96
Physiology	97
Algebra Higher "B"	80
Algebra Higher "A"	98
Natural Philosophy	97
Zoology	100
Logic	95
Astronomy	99
Geometry	100
Trigonometry	99
Analytical Geometry	100
Calculus	99
Latin Grammar	91
Latin Reader	92

⁷ *Rays New Higher Arithmetic* (1880), which is a revision of *Rays Higher Arithmetic* (1855), is likely the textbook that was used.

⁸ The Elements of Natural Philosophy (1870) by Sidney A. Norton Although dated, it is a fine model for a course for the general student.

⁹ *Ray's Algebra. Part Second: an analytical treatise, designed for high schools and colleges,* 1852.

¹⁰ *Ray's New Higher Algebra: elements of algebra for colleges, schools, and private students*, 1866. (Due to the numerous editions and changes in the titles of Ray's books, the titles given in footnotes 5, 7, 8, 10 and 11 may not be correct.)

There are several differences between the intended curriculum in the catalog and the courses that Finkel actually took. The titles do not match up very well, but note that the catalog only included one year. Finkel took several courses that one would expect a good mathematics student to take that are not in the catalog, namely, geometry, analytic geometry, and calculus. This is a wonderful example of the "intended vs implemented vs achieved curriculum" that is a central idea in the work of Nerida Ellerton and Ken Clements, in, e.g., their *Abraham Lincoln's Cyphering Book and Ten Other Extraordinary Cyphering Books* (2004), page 7.

For the 1883-1884 school year, the individuals teaching mathematics were:

Mrs. Eva Sisson Maglott, A.M. Warren Darst, A.M. H. E. Neff, B.S. Mrs. Regina M. Dixon, B.S. Josie Wood, B.S. Mathematics, Latin and English ,Literature Mathematics and Botany Mathematics and Natural Sciences Arithmetic, Analysis, History, and Orthography Mathematics and Latin

There are also some unnamed lecturers who "Will be the Best in the Field."



In the 1888-1889 college catalogue, the year Finkel received his B.S., only one mathematics teacher was listed, Mrs. Eva Sisson Maglott, affectionately known to the students as "Mother Maglott."¹¹ She began in 1881 and served as head of the mathematics department from 1884 to her death in 1916. Her husband, Frederik Maglott, was one of the founders of the school, a trustee, and also a professor of geography, German, Latin and Greek. They are commemorated in two stained glass windows in the ONU chapel. She applied for membership in the American Mathematical Society in 1894, and again in 1897, her application being tabled both times. Finally in 1911 she was elected a member¹².

Two of her students became well known mathematicians. One was, of course, Finkel. The other was Cassius Jackson Keyser (1862-1947), who earned a

Ph.D. at Columbia in 1902 and remained there for 26 years. He had two doctoral students: Emil Post (the Polish-American logician) and Eric Temple Bell (well, you know who he is).

A Mathematical Solution Book

After a year of college Finkel began teaching in rural schools while continuing work on his degrees. He taught first in Fostoria, Ohio, and later in Gibson, Tennessee (1889-1890). Then he became superintendent in North Lewisburg (1890-1891) and finally West Middleburg (1891-1892). On July 17, 1890, when he was just a few weeks older than 25, Finkel married a fellow student, Hanna Cokely, in Seneca County, Ohio.

During his years as teacher in Ohio, Finkel devoted his leisure time to solving and posing problems in a variety of periodicals which contained columns on mathematics, including the *Ohio Educational Monthly*, *The School Messenger*, the *Monthly* of Davenport, Iowa, the *Mathematical Magazine*, the *Mathematical Visitor*, and the *School Visitor*. Finkel awaited the arrival these magazines anxiously and was disappointed when they did not appear with regularity.

¹¹ 1888-1889 college catalogue. *University Herald*, June 16, p. 1.

¹² James J. Tattersall, "The Mathematical Department of the Ohio Normal University Herald" (unpublished, written 2014), page 2.

In 1887 he taught in a country school in Union County, Ohio and it was there that he began work on his *Mathematical Solution Book*, which was copyrighted in 1888.

It is difficult to imagine how a young man, who only studied algebra in his one year of college, and then with one year of teaching – clearly a scant mathematical education – could have compiled this 356 page book in one year, even if he did copy many problems from works listed in the four page bibliography of his sources at the end of the book.

The book was not published until 1893, a delay explained by the fact that his printer went bankrupt after composing 88 pages even after borrowing \$200 from the author [Finkel 1931, 308]. Undoubtedly through self-study, Finkel learned a great deal of mathematics while awaiting publication of *A Mathematical Solution Book*. It contains a large number of difficult problems in arithmetic, geometry, algebra, Diophantine analysis, and there are scattered references to the calculus. It is likely that Finkel continued to work on it for those five years, and there is internal evidence for this, for example: It is reported that William Hoover was elected to the London Mathematical Society in 1889 and to the New York Mathematical Society in 1890 (p. 338), that Henry Gunder was elected Professor of Pedagogy at Findlay College in 1890 (p. 311), and that Artemas Martin was elected a fellow of the AAAS in 1891 and was editor of *The Mathematical Messenger* in 1893 (p. 347).

Finkel's *Mathematical Solution Book* appeared in four editions, 1888, 1897, 1899, and 1902. R. F. Davis reviewed the fourth edition in the October 1903 volume of *The Mathematical Gazette*, a journal started the same year as the *Monthly*. Davis praises Finkel's care in preparing a largely error free book, which he finds "readable and instructive." A very positive review appeared in the *University Herald*, most likely written by Finkel himself [Tattersall, 7].

Not surprisingly, one of the problems in the book was the Man on the Ball (First edition, 1888, p. 393):

There is a ball 12 feet in diameter on top of a pole 60 feet L high. On the ball stands a man whose eye is 6 feet above the ball; how much ground beneath the ball is invisible to him? Construction .- Let BE be the pole, L the center of ball, and A the position of the man's eye. Draw AFC tangent to the ball at F and draw LF and BC. Then the triangle AFL is rightangled at F. 1. 60 ft .= BE, the length of the pole. 2. 12 ft.=ED, the diameter of the ball, and 3. 6 ft .= AD, the height of the man's eye above the ball. 4. 12 ft.=AD+DL=AL, Now 5. $AF = \sqrt{AL^2 - LF^2}$ =/(122-62)=6/3 ft. In the II. similar triangles ALF and ACB, 6. AF: LF:: A B: BC, or В 6v3 ft. : 6 ft. : : (6 ft.+12 ft. +60 ft.), or 78 ft. : BC. 7. $BC = (6 \times 78) \div 6\sqrt{3} = 78$ +1/3=1×78/3=26/3 ft. FIG. 68. 8. $\therefore \pi B C^2 = \pi (26\sqrt{3})^2 = 6371.1498932$ sq. ft.=the area of the circle over which the man can not see. III. .: 6371.1498932 sq. ft .= the area of the invisible ground beneath the ball.

Many of the problems in the *Solution Book* have a reference giving the source, but there is none here (and we have found none earlier than 1888). The solution of this problem is a good example of what Finkel calls the "Step Method" where the solution "takes up, in logical order, link by link, the chain of reasoning and arrives at the correct result" [Preface]. This technique is used throughout the *Solution Book*. There are many interesting things in the book. The attentive reader will note that our knowledge of the history of mathematics changes over time.

The Greek letter π , was first used by Euler, to designate the ratio of the circumference to the diameter. [Second edition, 1897, p. 196]

This was the commonly held view until it was pointed out that William Jones had earlier introduced the symbol in his *Synopsis palmariorum matheseos* (1706). This is corrected in the fourth (1902) edition of Finkel's *A Mathematical Solution Book*, p. 506.

Finkel at Ohio Normal University, 1886-1888

The *Ohio Normal University Herald* started publication as a monthly on June 20, 1885 and a Mathematics Department was introduced in May 1888 with sixteen problems. It is likely that Finkel inserted them, for in the June issue the editor noted that Finkel had taken over the column "with the pleasure of his work as his compensation" [Tattersall, 4]. While a student there, and for several years afterwards, Finkel conducted a mathematical column in the *University Herald*. We shall quote just one problem that Finkel posed and solved. If you change the names and probabilities, it is fresh today:

If in the campaign of 1884, Cleveland told the truth 3 out of 4 times, Blain 4 our of 5 times and St. John 5 out of 6 times, what is the probability of a statement being true that Blain and Cleveland affirmed and St. John denied? [*The University Herald*, 1885, pp. 389-390]

Kidder Institute, Kidder, Missouri, 1892-1895.

The Kidder Institute opened in 1884 in the defunct Thayer College whose abandoned building had been "given to the bats and the birds." The first principal was G. S. Ramsey. Most of the 120 boys "took the common branches with extra hard training in Arithmetic, History and Grammar to prepare to teach."¹³



¹³ Bertha Ellis Booth, The First Days of Kidder – Caldwell County, Missouri, n.d.

George Washington Shaw (1859-1932) was educated at Fostoria Academy in Ohio, where Finkel later taught, and then went to college at Ohio Wesleyan from 1884 to 1887 where he graduated with a Bache-



lor of Arts degree. Shaw completed the Classical Course, which placed an emphasis on the study of Greek and Latin. In 1890, the university awarded Shaw a Master of Arts *in cursu*, a degree given to alums who "maintained a good moral character" for three years after graduating and paid a fee of five dollars. This photo hung in the Kidder chapel before it was named the Shaw Memorial.

In 1887-1888 he was principal of the High School in Gibson, TN and then principal of the Fostoria Academy in 1888-1889. Then, in 1889, he became the principal of the Kidder Institute in Kidder, MO, and remained there until his death in 1932. He later received a D. Litt from Drury College. [*Missouri Historical Review*, 26 (1931), 321].

Finkel "became thoroughly discouraged and disheartened because of the dishonorable political methods used in securing positions in most of the city schools in Ohio," and so in 1892 joined his friend, G. W. Shaw, the Head of Kidder School where he often taught forty-five three-quarter-hour periods per week. (Later, at the college level, he only taught from nineteen to twenty-seven hours per week.) The Kidder School was free of the "petty politics so deadening to intellectual honesty and spiritual development," so Finkel was finally able to "ascend to the mountain heights of imagination and get glimpses of things unseen."

Starting a Journal for Mathematics Teachers

Finkel's variety of teaching experience made him keenly aware that the "mathematical teaching in our high schools and academies was very deplorable and even worse in the rural schools." Consequently he had "the ambition to publish a journal devoted solely to mathematics and suitable to the needs of teachers of mathematics in these schools."



Finkel secured the assistance of John M. Colaw¹⁴ of Monterey, Virginia, whom he knew through his contributions to the *School Visitor*, to assist him as co-editor. Colaw was born in 1860 in Virginia, earned a BA in 1882, and a MA in 1885 from Dickinson College in Pennsylvania. While working on his MA he took a one-year break to study law at the University of Virginia, being admitted to the Virginia Bar in 1886. Finkel had never met Colaw, but was impressed with his contributions to the *School Visitor* [*AMM*, 1957, 3]. They were both subscribers and avid contributors.

The School Visitor; An Elementary Monthly Journal Devoted to Difficult Work in Common School Studies, was published by Professor John S. Royer (1845-1915)¹⁵

in several Ohio cities beginning in 1880. After 15 years, Finkel wrote, it was discontinued "owing to the nervous strain it caused and the tax it levied on the vital force of its editor" and called it "the most practical and stimulating periodical that the ordinary teacher can read" [*AMM*, 1902, 276].

¹⁴ John D. Maxwell, "John Marvin Colaw: and the American Mathematical Monthly," AMM, 1993, 117-118.

¹⁵ For a short biography of Royer, a noted teacher, see *The Ohio Teacher*, 36 (1915), 201. When Royer retired he sold his journal to *The Ohio Teacher*.

In the fall of 1893, Finkel decided to give his journal an ambitious and prophetic title, *The American Mathematical Monthly*.

Finkel and Colaw then began writing high school teachers of mathematics and professors in the colleges and universities in order to solicit subscribers and contributions (none of these letters have been located). The first response came from the superintendent of the Kansas City schools, J. M. Greenwood, who enclosed his check for \$2.00, and a promise that he would bring the new journal to the attention of all his mathematics teachers. The first response from the university level came from George Bruce Halsted of the University of Texas, the "stormy petrel" of the mathematical world, who was "in his element when in the midst of a violent verbal storm initiated by himself or otherwise." Halsted promised contributions for publication and sent a check for \$30.00, an amount he contributed each year until he was fired at Texas for one of his verbal storms.¹⁶

The first issue of *The American Mathematical Monthly* appeared in January 1894. Finkel's introduction to the issue proclaimed the purpose of the journal and indicated that there would be a problem section — a section that has been a mainstay of the *Monthly* for more than a century. His words are both modest and autobiographical:

While realizing that the solution of problems is one of the lowest forms of Mathematical research, and that, in general, it has no scientific value, yet its educational value cannot be over estimated. It is the ladder by which the mind ascends into higher fields of original research and investigation. Many dormant minds have been aroused into activity through the mastery of a single problem. The American Mathematical Monthly will, therefore, devote a due portion of its space to the solution of problems, whether they be the easy problems in Arithmetic, or the difficult problems in the Calculus, Mechanics, Probability, or Modern Higher Mathematics.

At the beginning, Finkel hired a Chicago engraver to make the wood-cuts, but this was too expensive. Finkel made his first wood-cut — with a penknife no less — in Volume 1, page 71. He continued to do this for most of the first 19 volumes [Finkel 1931, 312].



¹⁶ In 1903 Halsted was fired after publishing articles in *Science* and the *Education Review* that criticized the university for hiring university graduate and high school teacher Mary E. Decherd over his protégé R. L. Moore, whom Halsted hoped to have as an assistant [John Parker, *R. L. Moore: Mathematician and Teacher*, pp. 36-38].



First issue of the Monthly, January 1894

The editor and publisher of the local newspaper in Missouri, Edward J. Chubbuck, was daring enough to agree to print the new journal. While Finkel dealt with the editorial work, his wife proofed the work of the inexperienced typesetters and "served as 'circulation manager' personally wrapping and addressing every copy." [*Kansas City Star*, May 11, 1939].

Drury College, Springfield, Missouri, 1895-1940

In June, 1895, through the influence of Dr. Henry Hopkins, pastor of the First Congregational church, Kansas City, who was a member of the board of trustees of Kidder Institute and also of Drury College at Springfield, Dr. Finkel was elected head of the department of mathematics and physics at Drury. [*Kansas City Star*, May 11, 1939]

One of the first things Finkel did in Springfield was to make arrangement for publication of the monthly in Springfield by S. A. Dixon.

Financial problems arose early in the Monthly's history:

We shall consider it a great favor if all the subscribers who have not paid their subscriptions for 1895 will kindly remit at once. We need the money to pay the printer. [*AMM*, 1895, 171]

There are a number of subscribers in arrears for 1894. We shall consider it a kindness if those who are owing for 1894, will remit the amount of the subscription at once. A mathematical journal of the size and scope of the Monthly can not be published without funds, and were it not for a number of mathematical friends [e.g., Halstead] aiding us financially the MONTHLY would be obliged to discontinue.

In 1895, Finkel was offered scholarships by the University of Chicago and Yale University to study for a Ph.D. He accepted the scholarship from the University of Chicago but, having been offered the professorship at Drury College in Springfield, Missouri, he resigned the scholarship. Immediately after moving to Springfield, he set off for Chicago, which had just opened in 1892, where he attended the second summer session. While we don't know what he studied, we do know what was offered:

THE UNIVERSITY OF CHICAGO. — During the summer quarter of 1895 the following courses (four hours weekly) in advanced mathematics will be given: by Professor Moore, Linear differential equations, Theory of functions of a complex variable; by Assistant Professor Maschke, Higher plane curves, Differential geometry of curves and surfaces; by Dr. Young (for first term), Mathematical pedagogy, Determinants; by Mr. Slaught, Differential equations; by Professor Smith of Shurtleff College, Advanced analytic geometry. [*Bulletin of the AMS*, 1, p. 260]



That summer he met and became friends with Leonard Eugene Dickson. Two years earlier, as a nineteen-year-old undergraduate student of Halsted at Texas, Dickson had published an article on Pythagorean Triples in the very first issue of the Monthly [19(1912), 184]. In 1896 Dickson became the first of E. H. Moore's 31 Ph.D. students.

While in Chicago the first of September [1902], we called on Dr. Dickson and urged him to join us in the editorship of the Monthly. Not seeing his way clear at the time, he withheld his answer until he could consider the matter. After some meditation, he decided affirmatively. [AMM, 1902, 240]

Before long, Dickson accepted Finkel's invitation (Colaw having become involved in writing elementary textbooks). Finkel called this "a red-letter day in the history of the Monthly" [Finkel 1931, 314]. Dickson took full charge of the papers published in the *Monthly*, while Finkel continued to deal with the problem section. Immediately after the announcement that Dickson was to be co-editor, we see his first editorial contribution:

The hundredth anniversary of the birth of Abel, the eminent Norwegian mathematician, was celebrated during September at Christiania. Representative scientists from many countries were present. Among those upon whom honorary degrees were conferred were Simon Newcomb and J. Willard Gibbs. L.E.D.

After receiving a B.S. (1888) and M.S. (1891) from Ohio Northern, Finkel received an A.M. (1904) from the University of Pennsylvania. He wanted to earn a Ph.D., but realized that he would need additional help in running the journal. In 1904 Saul Epsteen joined the staff and a year later O. E. Glenn was added to the staff [*AMM*, 19 (1912), 200 and 64 (1957), 3]. They helped during the two years when Finkel was working on his Ph.D. In 1906 Finkel earned a Ph.D. from the University of Pennsylvania with a dissertation on the *Determination of All Groups of order 2^m which contain Cyclic Self-conjugate Sub-groups of order 2^{m-4} and whose Generating Operations correspond to partitions, (m - 4, 4), (m - 4, 1). This was accepted for publication in the University of Pennsylvania Publications, Series in Mathematics*, but was not published as this series ceased publication in 1905. His dissertation was to be presented at the 138th AMS meeting at Columbia on April 25, 1908, but was "read by title" as he was not

present [*Bulletin of the AMS*, volume 14, p. 409]. Judging by other students who received Ph.D.s from Penn about this time, his advisor was likely George Hervey Hallett, Sr.

We don't have much evidence of Finkel's success as a teacher. We do know that the Junior Class at Drury dedicated the the 1909 yearbook to him with these words:



TO BENJAMIN F. FINKEL HEAD OF THE DEPARTMENT OF MATHEMATICS AND PHYSICS AT DRURY COLLEGE WHO BY HIS NEVER TIRING AID AND EVER READY FRIENDSHIP HAS WON OUR SINCERE LOVE AND AFFECTION, THIS ANNUAL IS GRATEFULLY DEDICATED BY THE JUNIOR CLASS



Dr. and Mrs. Finkel with the Drury Math Club (1934)

At this time, Dickson stepped down from the editorship of the *Monthly* as he joined the staff of the *Transactions of the American Mathematical Society* with volume 7, 1906. Slaught wrote that when Dickson "became an editor of the Transactions and had gained an international reputation, he still remained true to the *Monthly*." Dickson continued to publish in the *Monthly* and his articles added tone and interest, according to Slaught.



Dickson "suggested that his mantle be placed upon the shoulders of the aggressive, indomitable, and persevering Professor H. E. Slaught." After seeking Dickson's advice on the best way to serve the mathematical community, and "After a very conscientious debate with himself, he decided to devote his life to the promotion and improvement of the teaching of mathematics rather than to a research career." Consequently, Slaught accepted, and so the journal continued in strong mathematical hands. He served as an editor from 1907 to 1937. In 1913 he became Managing Editor and continued to hold that position until 1918 when the post was renamed Editor-in-Chief. He was then Editor-in-Chief 1916-18.

Finkel wrote that a "second red-letter day in the history of the Monthly" occurred in 1907 when Slaught replaced Dickson as editor along with Finkel [Finkel 1931, 314].

Slaught had graduated A.B. from Colgate University in 1883 and took a teaching position at the Peddie School in Hightstown, New Jersey, because he was interested in classics, but he quickly impressed people with his mathematical ability and showed great promise as a teacher and administrator. He married the music teacher, Mary L. Davis, at Peddie in 1885 and she encouraged him to use his talent to move up to university teaching. He applied for a fellowship at Johns Hopkins University to pursue a doctorate. This was not to be, for Fredereick Taylor Gates, an advisor to John D. Rockefeller (primary benefactor of the University of Chicago), through his fund raising efforts for Peddie got to know Slaught. He arranged for Slaught to meet President William Rainey Harper who was scouting for graduate students and faculty (he raided the faculty at Clark University) at the newly founded University of Chicago, and offered Slaught a two-year fellowship. He joined the University in 1892 when it opened. When his fellowship ended, he joined the teaching faculty, but because of his heavy teaching load did not complete his doctorate, under the direction of E. H. Moore, until 1898. He remained at Chicago for his entire career, becoming assistant professor in 1900, associate in 1908, and full professor in 1913. He retired in 1931 and died in 1937.¹⁷

Slaught realized that more editorial help was needed, so in early 1909, he asked Alexander Ziwet, who was on the engineering faculty at the University of Michigan, for help in editing the *Monthly*. On February 29, 1909, Ziwet responded that the *Monthly* was "somewhat out of my line" and suggested that Wooster Woodruff Beman may be interested. "Besides him we have Dr. Karpinski who is much interested in the pedagogy and history of mathematics; he would probably be glad to contribute occasionally; but I do not feel sure that he would be suitable as editor or assistant editor."

Slaught had reason for his concern, for Finkel wrote him on October 10, 1909 on his own stationary that he was concerned that the *Monthly* has not been appearing on time. Money was of even more concern, for Finkel had been paying out of his own pocket. On January 27, 1910, Finkel wrote Slaught that he

¹⁷ W. D. Cairns, "Herbert Ellsworth Slaught — Editor and Organizer," AMM, 45 (1938), 1-4.

had signed a new contract with S. A. Dixon, who had been his printer in Springfield, Missouri, for 4 years. But the printing cost was high; he had to give him \$1.75 per page to get him to do the work.

Unfortunately, the schoolteachers of mathematics saw no need for such a journal and so the *Monthly* "became occupied with a more virile race of mathematicians," adopting itself as a repository of articles of permanent wealth to teachers of collegiate mathematics. Part of Finkel's plan failed; few high school teachers subscribed. But he had the foresight to enlist the help of university mathematics faculty such as E.H. Moore (University of Chicago). The Monthly resonated with the college mathematics faculty very well.

Transferring the *Monthly* to a wider group.

Slaught was an editor of the Monthly from 1907 to 1917. For his first two years, he "ran it much as it had been going," as he reported in 1910, but he "used every effort to extend its list of active friends and succeeded in drawing to its cause a large number of valuable contributors and supporters who had formerly known little about it."

As editor, Slaught made ambitious strides toward improving the Monthly. He wrote in a 1910 letter that from the beginning of his editorship he "saw that we needed further financial support as well as editorial cooperation." He also believed that the *Monthly* needed to switch to a higher-quality printing service to elevate its status.

By 1909, Slaught wrote that he had "induced the University of Illinois to join with the University of Chicago in joint support to the extent of \$50 annually, and Professor G. A. Miller at that time joined me [Slaught] as coeditor and director of the Monthly's destiny. Professor Finkel still managed the business end of the publishing and edits the problem department."

But there were problems with the Monthly. The typesetting was very difficult, and there were often delays. There were fears that the publisher would quit and, of course, there were constant financial worries. Finkel was afraid that he might have to cease publication. Consequently, in the summer of 1912, Finkel traveled to Chicago to visit Slaught and discuss these problems. Slaught was successful in enlisting the cooperation of other institutions and, beginning with Volume 19 (1912) the *Monthly* was published under the auspices of a dozen universities and two colleges. This arrangement was satisfactory, but not permanent, so Slaught approached the American Mathematical Society to see if they would take over the journal.

Slaught continued to solicit editorial support from colleagues and financial support from their educational institutions, including future MAA presidents E.R. Hedrick (University of Missouri), Florian Cajori (Colorado College), D.E. Smith (Teachers College at Columbia University), and G.A. Miller (University of Illinois), as well as E. J. Townsend (University of Illinois).

Townsend may have been the first to raise the possibility of bringing the Monthly to the American Mathematical Society (AMS) for support. In a May 17, 1912, letter to Slaught, he suggested that the AMS

might well undertake to publish a mathematical paper that would be of value to the teachers of mathematics in the high schools and the small colleges, and one which would influence the character of the instruction and at the same time stimulate mathematical interest in those schools upon which we must depend for mathematical students. In his reply, Slaught revealed the urgency of his need for financial support for the Monthly and suggested improving the Monthly first and later proposing that the AMS take it over:

I cannot long stand the pressure. I must either put the Monthly on a different basis or stand from under.

If your scheme, which you proposed with reference to having the Society take the Monthly over, could be put through, I should be only too glad to transfer the whole responsibility, including all editorial and business connection with the journal, and if you think that there is a chance of this being done, I should be only too glad to wait and see it tried. However, all the members with whom I have talked seem to feel very doubtful about this proposition at the present time. It may be best to go ahead as proposed above [with subsidies from educational institutions], and see what can be done with the Monthly, hoping later that the Society will take it over.

Slaught wrote to Finkel with a similar sense of desperation on November 6, 1912: "I had definitely promised myself that I must bring about this change [of the entire environment of the Monthly] between now and January first," he wrote, "or else withdraw entirely from the situation." After some persuasion by Slaught, Finkel agreed to transfer the rights to the journal to a board of editors, and Slaught met his January 1 deadline: The January 1913 issue stated that it was "published with the cooperation of the universities of Chicago, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Colorado College, and Oberlin College.

In the meantime, Slaught had succeeded in bringing the journal to the New Era Printing Company (later called Lancaster Press), which printed the Monthly from January 1913 through December 1925. With a more professional look and broader editorial cooperation, the Monthly grew more widely read and well regarded. It would need further, more stable financial support to keep up.

In 1914-1915 the Board of editors that "controlled and edited" the Monthly. It consisted of a representative of each school: C.H. Ashton, R.P. Baker, W.C. Brenke, W.H. Bussey, W.DeW. Cairns, Florian Cajori, R.D. Carmichael, D.R. Curtiss, I.M. DeLong, B.F. Finkel, E.R. Hedrick, L.C. Karpinski, G.A. Miller, W.H. Roever, H.E. Slaught. Of the twelve professors on the board, three served on an editorial committee, and three served on an executive committee. Slaught remained the managing editor and was part of the board, the editorial committee, and the executive committee.

The AMS and the *Monthly*: 1914-1915

Mathematicians associated with the Monthly and with the American Mathematical Society (AMS) began to consider whether the AMS should take over the Monthly. Up to that point, the AMS had dealt almost exclusively with mathematical research at the university level.

Some AMS members favored maintaining the research focus, sometimes with negative dismissals of any mathematics accessible to the "average mathematician" that Finkel and the Monthly tried to reach. Other members saw the task of improving college-level mathematics teaching as a crucial element of elevating the quality of university-level mathematics, and therefore as a worthwhile endeavor for the AMS. The debate was sometimes contentious.

On February 11, 1914, Dickson wrote to Professor Cole (of the AMS) with his views on the possibility. Dickson emphasized that he "would like to see the Monthly perpetuated for it does a good work in its field," and that "there is a wide constituency ... being interested and profited by the Monthly."

In the letter Dickson also foretold the formation of a new organization to back the Monthly:

Presumably, if the Society does not care to cover also the intermediate field, the Monthly must eventually be backed by an organization, corresponding to the Mathematical Association in England in its relation to the Mathematical Gazette. While I have not heard those behind the Monthly say that they contemplate an Association of Teachers of Mathematics, provided the present overtures to the Society fail. Still it seems clear to me that such an organization will eventually arise in America, and doubtless the backers of the Monthly have some plan in mind in case the present one fails. Whether our Society should head off such an organization by taking care of that constituency is a question of considerable importance, especially as the affirmative action would make the Society much more heterogeneous.

Dickson was unsure about what he identified as the important question: "whether the interests of mathematics in this country, in contrast with the mere interests of the Society, are best served under the present limitation of our energies in the direction of higher mathematics, rather than, by the proposed enlargement of energies, by attention also to intermediate mathematics."

He continued, "Either the Society should join in such an enlargement of its functions, or should gracefully acquiesce to an inevitable new organization, which instead of harming our Society should do us good." On this question, Dickson declined "to attempt to express even a tentative opinion, except that [he] would favor a discussion."

Other key players ventured to express opinions. D. E. Smith wrote to Slaught on February 13, 1914,

With respect to enlarging the scope of the American Mathematical Society in the way that you suggest, I fear that the proposition is a doubtful one. The London Mathematical Society does not take in the teaching element; the Circolo of Palermo confines itself to Pure Mathematics, and in general there is in every leading country a society that publishes material as ours [the AMS] does, which not one member in a hundred can read, at least with any pleasure.

I should think we could secure better results by keeping the American Mathematical Society a blueblood organization that stands for sound mathematics, and then put all the energy we can into organizing associations of teachers of mathematics, as we are doing at present.

Another future MAA president, E. R. Hedrick, wrote to Cole on April 28, 1914, with an opposite opinion:

It is true that I believe that the Monthly has a place, and that it should continue to exist. I believe that the persons best served by the Monthly are on the whole about the same persons who are touched by the present activities of the Society, plus some other people. I am firmly opposed to the creation of an organization other than the Society which should undertake to support the Monthly and ask the support as members of these people. Indeed, unless absolutely forced, I would refuse to join in the formation of such an organization other than the Society.

I firmly believe in the present activities of the Society, individually and severally, for all those now served. I firmly oppose all possible changes in this established work and service, and anything which would lessen the efficiency of that work, or get in its road. I cannot see that extending the scope of the Society's efforts would damage its established functions. That is about all that I think on this subject. Is it heresy?

In April 1914, Slaught presented a proposal to the Chicago Section of the AMS to set up a committee of five to investigate whether the Society should take over the publication of the *Monthly*. As Secretary of the Chicago Section of the AMS and editor of the Monthly, he formally submitted a proposal to the AMS on December 28, 1914. On April 23, 1915, the AMS Council voted, three to two, deeming it unwise to take over the *Monthly*. The final resolution stated,

It is deemed unwise for the American Mathematical Society to enter into the activities of the special field now covered by the American Mathematical Monthly; but the Council desires to express its realization of the importance of the work in this field and its value to mathematical science, and to say that should an organization be formed to deal specifically with this work, the Society would entertain toward such an organization only feelings of hearty good will and encouragement.

Benjamin Finkel's dream has substantially come true;

A Sad Ending

In 1957 Charles W. Trigg wrote

In 1934 Finkel became inactive in the problem department although he remained on the editorial board until his death on February 4, 1947. [Trigg 1957, p.1].

The situation was much more complicated than this sentence indicates. Finkel's work had deteriorated and there were numerous complaints about it. But it was a delicate situation. W. B. Ford writing from Ann Arbor to Slaught on January 8, 1933 commented:

It looks to me as though somebody diplomatically inclined would simply have to figure out some way to let Finkel gradually fade out of the picture. If that can't be done then let him resign as he threatens, and follow this up by a resolution by the Trustees expressing the indebtedness of the Associations for his early activities, etc. etc.

A week later, Bussey wrote to Slaught that

During my five years as editor I regarded [Otto] Dunkel as the *responsible* editor of "Problems and Solutions." Professor Finkel was just a figurehead. I agree with all that Carver has said about the *unfitness* of the material sent by Finkel to Dunkel. In my judgment Finkel is not qualified to be the *responsible* editor of "Problems and Solutions." He lacks not only the mathematical ability that Dunkel has but also the ability or else the inclination to put the material that comes to him in decent shape for the printer. Let Finkel resign.

Walter B. Carver to Slaught, November 1, 1932

I am having some little difficulties with respect to the Problems and Solutions department of the Monthly because of the divided responsibility. I want to move carefully, because I do not want to offend Finkel . . . Contributors write directly to Finkel. He makes up copy, mostly by clipping from letters sent to him. The copy looks pretty bad — frequently much worse than the sample sheet enclosed. The names of proposers and solvers are frequently wrong. Finkel does not correct or return page proof.

Even with these serious concerns he felt that nothing should be done to offend Finkel. His editorial work did not improve and on January 3, 1933 Carver wrote Slaught again:

the material as Finkel sends it out from his office is in no shape for publication. . . . Much of Finkel's material is unfit for publication for two kinds of reasons — it is often illegible and in very bad shape mechanically, and it is often lacking in clearness and very unhappy in expression. Occasionally it is definitely wrong mathematically.

Carver was not the only one who was unhappy. He reported two weeks later to Slaught that Finkel had sent an ultimatum that he will send no more material to Dunkel and will not work with him. The situation was not hopeless, but it was another year, February 20, 1934, before Carver wrote to Cairns that "Finkel had asked that no mention be made in the Monthly of his resignation."

There is no record of when Finkel actually gave up editorial responsibility for the problem section, but there is an undated draft of a four-page letter from Slaught that reads in part:

The Trustees have informed me "that you are desirous of retiring from active responsibility for the Department of Problems and Solutions in the Monthly. While acceding to your wish in this particular, the Trustees indicated their very urgent desire that you should continue as an associate editor with no specific duties."

Slaught closes with his own personal touch: "I would say that you are the Dean of Problem Solvers in America." He is aware of how delicate this issue is and has high praise for Finkel throughout. After

many years of working together this had to be a sad ending for these two men who had devoted so much of their life to *The American Mathematical Monthly*.



Finkel retired as head of the Department of Mathematics and Physics after 43 years at Drury College in 1937, but continued to visit "to see that things are going all right." He was "extremely friendly, cordial, friendly. His hearty laugh belies the age his white hair would indicate." His home retained its 1900s look and his extensive library contained a good deal of classical literature as well as mathematics [*The Drury Mirror*, April 28, 1944]. Unfortunately the disposition of his books and nachlass are unknown.

At 5 A.M. on January 1, 1938, Finkel returned from an A.A.A.S. meeting in Indianapolis. Not having a key, he rang the door-bell. Hanna Finkel — "Mother" as she was affectionately called by the students — "in an effort to find the light-switch in her bedroom, became confused in the dark, wandered out into the hall and to the back stairway and fell down the en-

tire flight, sustaining fatal injuries." She died almost four weeks later on January 29, 1938. At the funeral, Drury College President Nadal remarked that "she has stood beside Dr. Finkel with understanding and sympathy, helping him with his work" [*Drury College Bulletin*, July 1938].

Doctor Benjamin Franklin Finkel died at his longtime home at 1227 Clay Street in Springfield, Missouri, on February 5, 1947. He was eighty-one years old. The Finkels had three children. At the time of his death in 1947 they were Mrs. Lucile Whitney of Alabama and Mrs. Louise Lockwood of Toledo¹⁸ Their only son, Calvin Randell Finkel (1891-1908), was a member of the Drury class of 1912.¹⁹

Happiness had entered his life two years earlier when he married Mary Frances Ford, 57, at the Congregational church, where he had been a lifelong member. He was a staunch Republican. He is buried next to his first wife and parents in the Reber Hill Cemetery near his birthplace in East Ringgold, Ohio. Requiescat in pace.



Dr. and Mrs. Finkel on the Ohio Farm they still owned.

¹⁸ Drury College Bulletin, January 1947; this must have come out late as it reports on Finkel's death on February 5, 1947.

¹⁹ On Halloween night, October 31, 1909, he and some friends were playing pranks on the faculty on campus. When spotted, he was ordered to stop, but did not. Then he "was shot down . . . by a cowardly special officer who was hired to guard Drury campus against depredations for that night." Officer Charles Finn, the "fool with a gun," was charged but not convicted for Calvin's death [The Drury Mirror, November 6, 1908 and April 9, 1909].

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