Little and Haseman – early American tabulators of knots.

by

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Abstract

We discuss lives and work of two early American researchers working on tabulation of knots: Charles Newton Little (1858 - 1923) and Mary Gertrude Haseman (1889 - 1960(?)).

Little

Charles Newton Little (born on May 19, 1858; died August 31, 1923).

Little was born of missionary parentage at Madura, India, in 1858. He was a graduate of of the University of Nebraska, where he took the A.B. degree in 1879 and the M.A. degree in 1884. He took his degree of Ph.D. at Yale in 1885 (his thesis "On knots, with a census for order 10" were published in Trans. Connecticut Academy Sci.), and afterward studied in Germany with Klein and Hilbert (1898-1899). His work on knots attracted the attention and interest of Professor Tait, of the University of Edinburgh.

Little - cont.

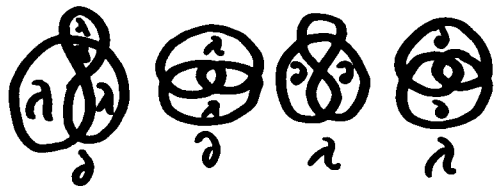
From Obituary in Science (Science, Vol. LVIII, No. 1508, October 1923, N.Y. City, the Science Press. Written by D.M.Lehmer):

"Professor Little, Dean of the College of engineering in the University of Idaho, passed away suddenly from hearth failure in Berkeley, on Septe ber 7. [This is a mistake; Little died Aug. 31]. ... He took his degree of Ph.D. at Yale in 1885 and afterward studied in Germany with Klein and Hilbert. His work in the theory of knots was of fundamental importance. "

Little - cont.

Little wrote in his last knot theory paper (Non-alternate ± knots, *Trans. Royal. Soc. Edinburgh*, 39, 1900, 771-778.): "To the kind courtesy of Professor Felix Klein and P.Stäckel, for which I here express my appreciation, I owe the opportunity to examine the topological *Nachlasse* of Gauss and Listing. The former will in the forthcoming Bd.VIII., *Gesammelte Werke*, and must not be commented upon in advance of publication. The latter contains among the drawings of reduced knots not figured in the *Vorstudien*, a sheet bearing date March 18, 1849, on which are the following forms marked as equivalent:

$$\begin{cases} 2\partial^3 + \partial^2 \\ 2\lambda^3 + \lambda^2 \end{cases}$$



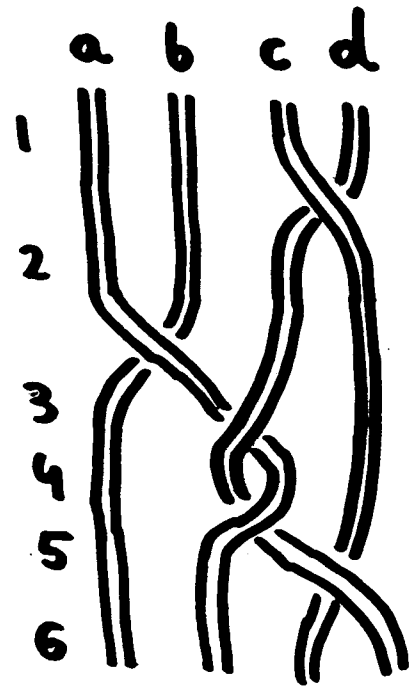
The interest of this series lies in the fact that

it shows that Professor Listing fifty years ago recognized the amphicheiral character of this knot."

1825

b	2	2	1	1	1	1
c	3	4	4	4	4	3
d	4	3+i	3+i	2+2i	3+2i	4+3i

Ver.
Coordin.



Es kommt daraus den
Irbegriff der Ververklungs

[from this you get
the essence of knotting]

Johann Benedict Listing

Born: 25 July 1808 in Frankfurt am Main, Germany
Died: 24 Dec 1882 in Göttingen, Germany

Click the picture above
to see a larger version

Show birthplace location

Previous (Chronologically) Next Biographies Index
Previous (Alphabetically) Next Main index

Johann Listing's family were of Czech descent. A student of Gauss in 1829, he became a lecturer i Hannover. He was appointed to Göttingen where he worked with Wilhelm Weber. Listing became professor of physics in Göttingen in 1849.

Listing wrote the book *Vorstudien zur Topologie* in 1847. It was the first use of the word topology. subject was known *as analysis situs* for many years and only in the late 1920's was the English wor *topology* used by Lefschetz.

In 1858 Listing discovered the properties of the Möbius band at almost the same time, and indepen of, Möbius.

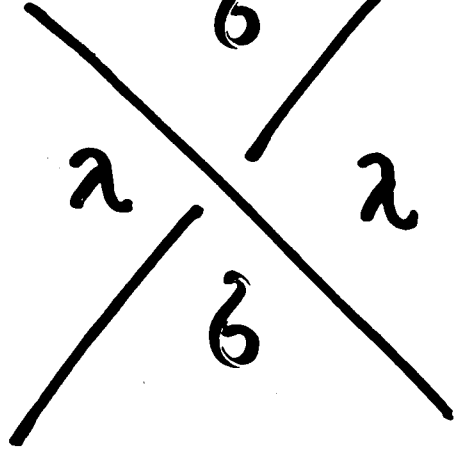
Listing produced a major work on optics and other work on applied mathematics.

List of References (7 books/articles)

A Poster of Johann Listing

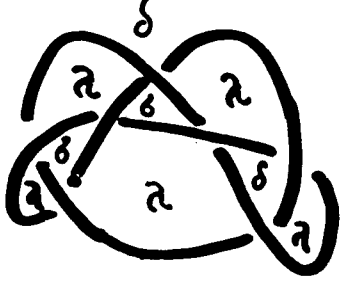
Cross-references to History Topics Topology enters mathematics

"Vorstudien zur Topologie" is old but beautiful book and should be translated into English (and Japanese) after 15



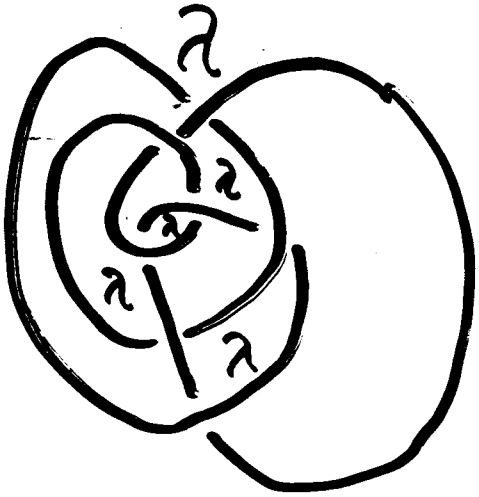
λ denotes the
leotropic angles

δ denotes the
deotropic angles
(directions



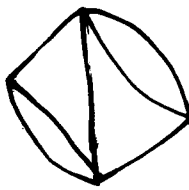
$\delta^5 + 3\delta^3$

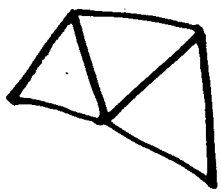
$\lambda^4 + 2\lambda^3 + 2\lambda^2$



$2\delta^4 + 2\delta^3$

$\lambda^4 + 2\lambda^3 + 2\lambda^2$





Listing 1847

Equivalent knots, different polynomials

Little - letter to Bessey.

From letter [Stanford University, Cal, Feb. 3; 1901] to Professor C.E.Bessey, University of Nebraska:

"...Such quick recognition of the importance of the issue that has caused the Stanford upheaval, strengthen very greatly the hands of those of us who have felt it our duty to protest, with all the emphasis that we could command, against attack upon academic freedom in the discussion of public question... Moreover for eight years I have been absolutely out of touch with engineering and wholly given over to mathematics. Naturally it would be, by far, more satisfactory for me to continue in the work of these later years; particularly as I have always looked upon mathematics as my life work.
Nevertheless I am not in the position of one who can pick and choose..."

Little - cont.

Little wrote in 1901: "...for eight years I have been absolutely out of touch with engineering and wholly given over to mathematics. Naturally it would be, by far, more satisfactory for me to continue in the work of these later years; particularly as I have always looked upon mathematics as my life work. Nevertheless I am not in the position of one who can pick and choose..." Little was a professor of civil engineering at University of Idaho from 1901 until his death; also dean of College of Engineering since 1911.

Little - cont.

In obituary in Science his last weeks of live are described as follows: "In the last few weeks of his life, on being relieved of his duties as dean of the college of engineering, he turned again to these researches [knot theory] and under the inspiration of sympathetic associates he was laying his plans for another assault on this most difficult field of analysis situs."

Little

Married August 5, 1886, in Lincoln to Emma R., daughter of Otto and Catharine (Müller) Funke. No children.

Death due to hearth failure. Cremation at Spokane, Wash. Survived by wife and a sister, Mrs. W. J. Adamson, of Lincoln.

Little - Bibliography.

1. American Men of Science, A biographical Directory 1921, 3'rd edition, Edited by Catell, J.McKeen Brimhall, Dean R. Garrison, NY, The Scientific Press.

2. Who was who in America, Volume I, (1897-1942), Marquis Who's Who Incorporated Fift Printing (1962), p.234.

3. Yale University, Obituary Record of graduates deceased during the year ending July 1, 1924, New Haven (Published by the University), 1924, p.1211.

Little - Bibliography.

4. D.M.Lehmer, Obituary of C.N.Little,Science, Vol. LVIII, No. 1508, October 1923, N.Y. City, the Science Press.

5. The Idaho Statement, Sept. 7, 1923, Obituary.

6. "The Supply and Demand for engineering graduates in the United States", 1911.

7. Calvin Warnick, A spirit of Excellence, University of Idaho, Moscow, Idaho.

Haseman

Mary Gertrude Haseman (1889 - 1960(?)).

Haseman was the fifth doctoral student of C.A.S at Brynn Mawr College. She was born March 6, 1889, at Linton, Indiana, to John Diedrich, Sr. and Elizabeth Christine Haseman. She prepared to go to college at the High School of Linton, Indiana. From 1907 to 1910 she attended the University of Indiana, from which she graduated with the degree of Bachelor of Arts, Cum Laude, 1910. From 1910- 1911 she taught mathematics at Vincennes University She was a graduate student at Bryn Mawr College from 1911 to 1915. In 1911-1912 she held a scholarship in mathematics, In 1913-1915 she held the Resident Fellowship in Mathematics. In the academic year 1915-1916 she attended lectures of Professor Morley at John Hopkins University.

Haseman - cont.

At Bryn Mawr she studied under the direction of Professor C.A.Scott and Dr. James Ryals Conner of the Department of Mathematics, W.B. Huff of the Department of Physics. Mary's major and associated minor was mathematics, with independent minor, physics.

Haseman's PhD thesis "On knots, with a census of the amphicheirals with twelve crossings", were published in 1918 in Trans. Roy. Soc. Edinburgh. In 1935 Haseman published a brochure "Curve tracing" based on on a series of lectures given by Charlotte Angas Scott at Bryn Mawr.

Haseman - Bibliography.

1. M. G. Haseman, On knots, with a census of the amphicheirals with twelve crossings, *Trans. Roy. Soc. Edinburgh*, 52 (1918), 235-255 (also Ph.D thesis, Bryn Mawr College, 1918 [?]).

2. Comprehensive Dissertation Index, 1861-1972, Volume 5: Mathematics and Statistics, Xerox University Microfilms, Ann Arbor, Michigan, 1973.

3. Mary Gertrude Haseman, Curve tracing, 1935.

Haseman - Bibliography.

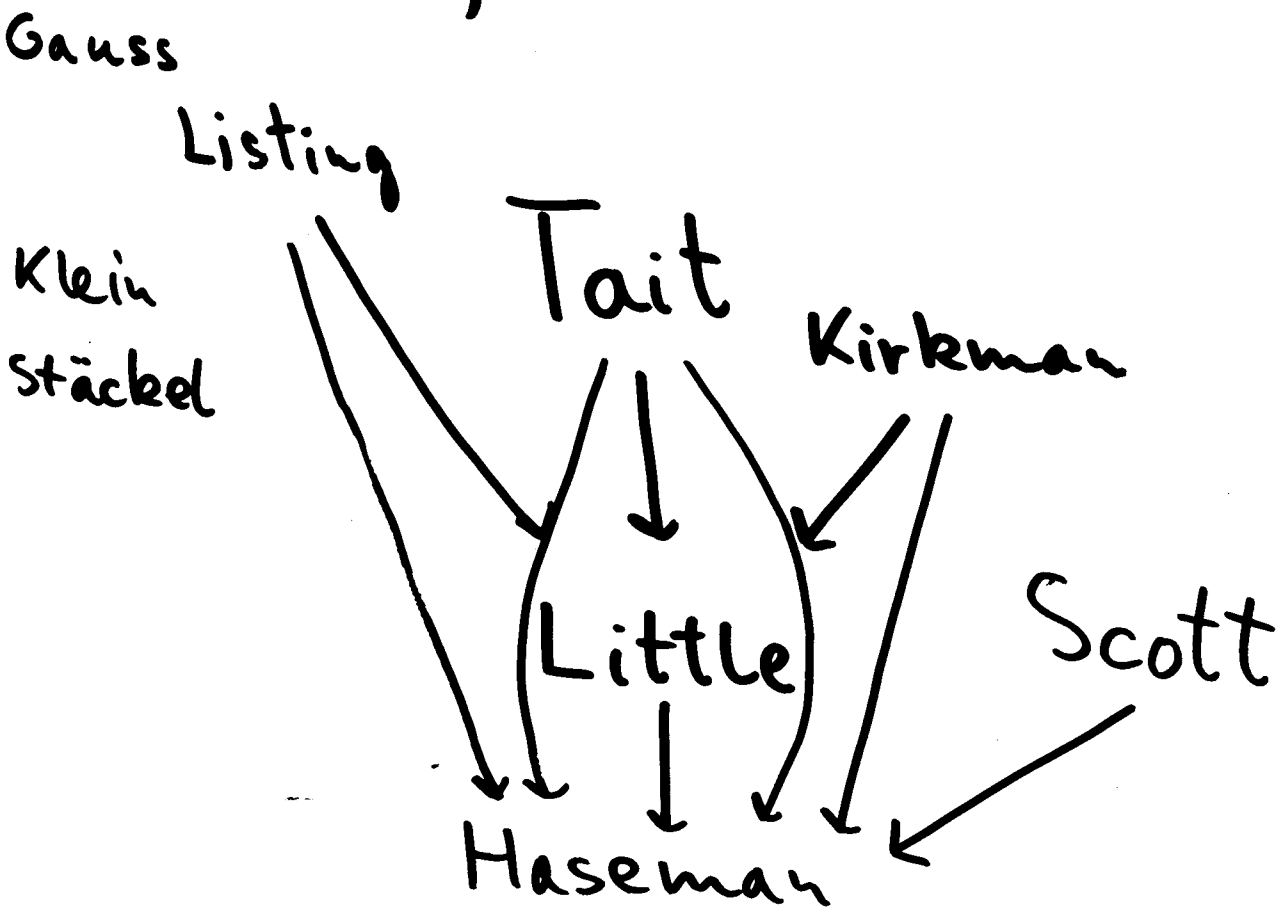
1. M. G. Haseman, On knots, with a census of the amphicheirals with twelve crossings, *Trans. Roy. Soc. Edinburgh*, 52 (1918), 235-255 (also Ph.D thesis, Bryn Mawr College, 1918 [?]).

2. Comprehensive Dissertation Index, 1861-1972, Volume 5: Mathematics and Statistics, Xerox University Microfilms, Ann Arbor, Michigan, 1973.

3. Mary Gertrude Haseman, Curve tracing, 1935.

4. Judy Green, Jeanne LaDuke, Contributors to American Math. an overview and selection; in Women in science, righting the record Indiana University Press, 1989.

Influences:


Gauss
Listing
Klein
Stäckel
Tait
Kirkman
Little
Scott
Haseman

Further Search

Wife of Little (letter to Jim Hoste?)

Siblings of M. Haseman

Leonard Haseman (?) 1884-1969?
Entomologist

John Haseman, Jr. (?) 1887-
Zoologist

Charles Haseman (?) 1880-1931
(Mathematics, Univ. Nevada)

Sarton ((1884–1956)

George Sarton, The Study of the History of Mathematics, 1936: " In short, the history of modern mathematics should be taught by mathematical teacher in the course of their ordinary teaching, while the history of older mathematics can be properly taught only by a specialist , who must be as much of historian as of mathematician , if not more.

Sarton - cont.

If the teaching of the history of modern mathematics is necessarily restricted, there is no reason why the mathematician should not study it by himself. In fact, there are many good reasons for his doing so. The mathematician's position with regard to history is almost the reverse of the historian's, for the field he is best prepared for is modern mathematics, while the investigation of ancient mathematics is probably beyond his ability.

Sarton - cont.

Generally speaking, mathematicians can hardly be expected to take active interest in historical research. Not only they lack the time for it, but mathematical creation is of its nature tyrannical and exclusive; it is difficult, if not impossible, for the creative mathematician to give much of thought to anything else, least of all to history, which involves an intellectual effort of an absolutely different kind.

Sarton - cont.

However, he may be obliged to investigate earlier writings in the very domain he is exploring, and this may lead him into historical interludes of greater or lesser frequency according to to the particular constitution of his own mind. Thus a man like Klein ended in giving considerable time and thought to historical matters without ever ceasing to be a creative mathematician of the first order.

Sarton - cont.

There is no doubt that a very large amount of work remains to be done, which can be done only by historically-minded mathematicians rathe than by mathematically minded historians. Furthermore, it is only when much of that work has been done, that is, when a great many analyses and partial syntheses of various kinds have been accomplished, that it will become at all possible to write the history of modern mathematics which Florian Cajori had in mind.

Sarton - cont.

The following remarks concern chiefly the mathematician who may be induced to do from time to time some of this historical, or semi-historical work. ... The long and the short of it is that the historian must always stand on his guard. 'Seeing is believing' will never do in scientific work. Seeing is not enough, for we often see things which are 'not so,' many statements which have all the appearances of genuineness and authority are nevertheless false, and our own perceptions may need various corrections.

Careless people will say that this errors do not matter.

Sarton - cont.

... The mathematician who has historical leanings should exercise himself in sundry ways, and attempt syntheses of various kinds: vertical (the evolution of an idea or of a man), horizontal (the knowledge attained at a certain time and place). Thus will he gradually master his subject, not only in its present stage, but in its very growth and life and in continuities of the whole past.

... The historically-minded mathematician of our time should analyze, sift , and classify the documents of the last century, prepare a number of partial syntheses, and thus facilitate the transmission to our descendants of those treasures of knowledge and humanity, and make possible the broader and deeper syntheses of the future.