Father Henri Bosmans (S.J.)

A Belgian pioneer in the history of mathematics

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Henri Bosmans was born in Malines, Belgium in 1852 and entered the Jesuit order in 1871. He was first assigned to the Jesuit college of Ghent. When he was asked in 1887 to replace the professor of mathematics at the Jesuit college of Brussels, this move would give a definitive orientation to his further life. It is only in 1894 that he begins publishing on the history of mathematics. What started out as hesitantly posing and answering questions under a pseudonym in *L'Intermédiaire des Mathématiciens*, grew into an impressive collection of publications of high scholarship. He turned out to be a prolific researcher and writer who could write confidently about his main subjects: Jesuit science and early modern mathematics. He was highly respected by his peers, which were not the least: David Eugene Smith, Moritz Cantor, Johannes Tropfke, Florian Cajori, Gino Loria, Gustav Eneström and Paul Tannery. Some of them he regarded as friends. By his death in 1928, almost 300 contributions of him appeared in scientific journals, ranging from small notes to 200-page articles, including transcriptions of manuscripts. In addition, about the same number of reviews of books and articles were published. He did not hesitate to be very critical about the work of others including Eneström's continued bashing of Cantor.
Despite the scope and merits of his work, Bosmans is little known today. Shortly after the death of Bosmans, Adolphe Rome, a canon from Louvain working on ancient Greek mathematics, published a biography and an annotated bibliography of Henri Bosmans in *Isis* (Rome, 1928). Two decades later, George Sarton, the founder of *Isis* wrote his emotional appeal to republish the papers of Father Bosmans in book form (Sarton, 1949). This was followed by both an updated biography and a bibliography (Bernard-Maître (1950). However, more than half a century later, Sarton's appeal for republishing Bosmans' work has not yet been answered. Now several initiatives have been launched to open up available material. An on-line archive currently contains all of Bosmans' publications (Heeffer, 2006), most of which are accessible in full text. A commemorative symposium on Henri Bosmans was held at the ULB in Belgium, on 12 and 13 May, 2006, the proceedings of which will soon be published (Stoffel 2007) including an updated biography (Hermans 2007) and bibliography (Heeffer 2007). For the rest of this short note, we would like to address two questions: 1) Why is it that today Bosmans is not recognized as many of his peers active in the early twentieth century? 2) What makes his work still of value today?

As to the first question, all of his publications were in French, and as such became more and more neglected in twentieth-century literature. But more so, he was missed out by the type of journals he contributed to. He published one article in *Isis* on Tacquet, but most of his other publication were confined to two local journals in Brussels, *Revue des questions scientifiques* and *Annales de la Société scientifique de Bruxelles*. Unlike Cantor, Tropfke, Cajori and Loria, he did not publish any books.

The type of publications reflects Bosmans's way of working. He was very much oriented towards the original sources, being rare books and manuscripts. While studying a text he took elaborate notes, sometimes copying whole books and manuscripts. Then he presented his findings for the *Société scientifique* which resulted in a publication. Therefore, his articles deal almost exclusively with persons or a single work of a person. Others, like Cantor, Cajori and Tropfke concentrated on larger-scope narratives or conceptual developments, an evolution which would become the standard in the later twentieth-century history of mathematics.

Despite these aspects which rendered Bosmans's work less appreciated, there are many reasons for reassessing his work. Firstly, the rigor and care he took in his handling of source material is unparalleled. This now appears to be of great value. There are several lost works which have been preserved thanks to Bosmans's industry. For example,. the library of the University of Louvain owned a copy of Stifel's *Arithmetica Integra* of 1544, with marginal comments by Gemma Frisius. In 1905, Bosmans meticulously copied the book by hand including Frisius comments. Respecting all type, position, marginal comments and even the printers emblem, Bosmans copy is an exact replica of the original. The book was destroyed in the fire of 1914 together with thousand manuscripts, 800 incunables and about 300,000 other books. Thanks to Bosmans we know that Frisius was actively involved with algebra, which is not apparent from Frisius own work, the *Arithmeticae practicae methodus facilis* of 1540, and also that he was rather sceptical with regards to Stifel's use of the second unknown. Also the only known copy of *L'Appendice Algebraique* of Stevin was destroyed in the fire but copied by Bosmans (van Praag 2004). When Bosmans cited or copied something you can be sure it is a faithful representation of the original source.

Bosmans's work is still of great value because of the originality of the material he discussed. Some authors and works he analyzed have in the mean time been studied more frequently but constituted at the time an uncovered domain. Sixteenth-century algebra by Jacques Peletier, Johannes Buteo, Guillaume Gosselin or Pedro Nunez was hardly studied before the twentieth century. And for each of these authors Bosmans was the first to provide an in-depth analysis of their work and to assess their significance within the history of algebra. Even concerning authors that have been studied more intensively in recent times, Bosmans often was a pioneer, as testified by Dijksterhuis on Simon Stevin: "It was only in the first decades of the twentieth century that the study of Stevin was undertaken in a thorough an systematic way, the leader of this movement being the meritorious Belgian historian of mathematics, Father Henri Bosmans S.J." (Dijksterhuis 1955, I, 14). Also for Jesuit scientists and missionaries such as Jean-Charles della Faille, Gregorius de Saint-Vincent, Achile Gerste, Jean de Haynin, Théodore Moretus, F. de Rougement, André Tacquet, Antoine Thomas and Ferdinant Verbiest, Bosmans was the first to study their works and provide reliable biographical information from manuscripts and archives. For several sixteenth- and seventeenth-century authors and works, Bosmans's contributions is often still the only available source today. For example, as far as I know, nothing has been published about Gilles-François de Gottignies's four intriguing work on algebra, since Bosmans in 1928.

Although Bosmans worked and published on single authors, his analyses display a deep insight in the broader scope of the development of mathematics. This is

especially clear for the development of symbolic algebra in the sixteenth century. On five occasions, in his articles on Frisius, Peletier, Nunez, Gosselin and Girard, he pointed out the importance of the solution of linear problems with multiple unknowns for the development of a symbolic equation. He expresses his discontentment with the lack of a methodical overview, for which he blames the long history of the subject. This was for me a reason to take up the subject and so it happened that Bosmans's perception became an important source of guidance for my own research (Heeffer 2006b). The development of the second unknown in the sixteenth century, as referred to by *Regula quantitatis*, became a driving force for the development of algebraic symbolism, operations on equations and as such, for the very concept of a symbolic equation. Bosmans always took great care to understand and explain the original symbolism of authors such as Nunez, Buteo, Gosselin and Stevin. Usually he showed problem solutions in their original symbolism and then discussed the reasoning steps in modern symbolism, always respecting the historical context of the sources. Many of his peers, like Eneström or Maximilian Curtze, only used modern symbolism and in doing so missed out conceptual changes and subtle differences between modern and historical methods of solving problems.

We hope that by opening up Bosmans's work in an on-line archive, there will be a revived interest in his publications. This has happened already for his work on Jesuit missionaries in China but his work as a historian of mathematics merits a wider audience.

References

Eduard Jan Dijksterhuis (ed.) (1955) *The Principal Works of Simon Stevin*, (5 vols.) Swets & Zeitlinger, Amsterdam.

Albrecht Heeffer (2006) *The Father Henri Bosmans (S.J.) (1852-1928) Archive*, online at http://logica.ugent.be/albrecht/Bosmans.htm.

Albrecht Heeffer (2006b) *From Precepts to Equations. The Conceptual Development of Symbolic Algebra in the Sixteenth Century*, Ghent University, Ghent.

Albrecht Heeffer (2007) "The Henri Bosmans Bibliography", to appear in Stoffel (2007).

Michel Hermans (2007) "Henri Bosmans: formation et réseaux de relations" to appear in Stoffel (2007).

Henri Bernard-Maître (1950) "Un historien des mathématiques en Europe et en Chine, le père Henri Bosmans S.J. (1852-1928) ", *Archives Internationales d'Histoire des Sciences*, Vol. 12, No. 3, pp. 619-628.

Henri Bernard-Maître (1950) "Bibliographier des œuvres du Père H. Bosmans", *Archives Internationales d'Histoire des Sciences*, Vol. 12, No. 3, pp. 629-656.

Adolphe Rome (1929) "Le R. P. Henri Bosmans, S. J. (1852-1928) ", *Isis*, Vol. 12, No. 1., pp. 88-112.

George Sarton (1949) "Preface to Volume 40: An Appeal for the Republication in Book Form of Father Bosmans' Studies on Belgian Mathematics in the Sixteenth and Seventeenth Centuries", *Isis*, Vol. 40, No. 1, pp. 3-6.

Jean-François Stoffel (ed.) (2007) Special issue on Henri Bosmans, *Revue des questions scientifiques*, 178, to appear.

Paul Van Praag (2004) "La retranscription de l'*Appendice Algebraique* par le Père Henri Bosmans" in H. Elkhadem, W. Bracke (2004) (eds.), *Simon Stevin 1548-1620 L'émergence de la nouvelle science*, Publications of the Belgian Royal Library, 6, Brepols, Turnhout, pp. 63-71.