Debeaune | Encyclopedia.com

(also known as **Beaune**), **FLORIMOND** (*b*. Blois, France, 7 October 1601; *d*. Blois, 18 August 1652)

mathematics.

Truly representative of a time of intense communication among intellectuals, Debeaune enjoyed great fame although he himself never published anything.

His renown was due entirely to Descartes. The *Notes brèves* that Debeaune wrote on the *Géométrie* were translated and added during his lifetime to the first Latin edition, published by Schooten in 1649. The second Latin edition (1659–1661) also contained two short papers on algebra, edited by Erasmus Bartholin, that are Debeaune's only posthumous publication. The letters published by Clerselier between 1657 and 1667 revealed to a wider public the esteem in which Descartes held his disciple from Blois.

Undoubtedly this was the reason why, in 1682, a chronicler concerned with celebrities of his province wrote a paper on Debeaune, drawing his information from sources close to the family while this was still possible. At the end of the nineteenth century a scholar from Blois confirmed the information by locating various documents in archives, and the great critical edition of Descartes's *Oeuvres* once again brought attention to Debeaune. Paul Tannery had the good fortune to discover a great many handwritten letters in Vienne, which enabled him to gain a great deal of scientific clarity.

On the basis of his interpretation of the signature of these letters, Tannery committed an error in insisting on the spelling "Debeaune," by which he is most frequently cited. Florimond's father, also named Florimond, was undoubtedly the natural son of Jean II de Beaune, brother of the archbishop Renaud de Beaune; but he was legitimized and his titles of nobility assured to his descendants.

A few accurate dates can be furnished for Debeaune. He was baptized on 7 October 1601. He married his first wife, Philiberte Anne Pelluis, on 21 December 1621. She died in August 1622, and he remarried on 15 December 1623. His second wife was Marguerite du Lot, who bore him three sons and one daughter. His burial certificate, designating him as Seigneur de Goulioust, is dated 18 August 1652.

Like Descartes, Debeaune at first did military service, but following a mysterious accident he had to lead a less strenuous life. Taking advantage of his law studies, he bought the office of counselor to the court of justice in Blois. The many years that he divided between this famous city on the banks of the Loire and his nearby country estate, excelling in both jurisprudence and mathematical research, bring Fermat to mind. However, Fermat does not appear on the list of correspondents that the chronicler of 1682 saw among the family papers, a list of which only a small part has been preserved.

Debeaune left his provincial retreat only for business trips to Paris. However, he had many visitors. The first part of Monconis' diary mentions observatory instruments made by him. An inventory made after Debeaune's death confirmed statements in parts of letters that have been preserved: he had built for his own use a shop for grinding lenses. He also had a magnificent library, worthy of a humanist of the preceding century.

Afflicted with various and painful infirmities, particularly gout, Debeaune resigned as counselor around 1648 and withdrew to a town house, the upper floor of which faced due south. There he had—at least for a time—an observatory at his disposal. However, his failing eyesight deteriorated rapidly, and he died shortly after having a foot amputated.

When he was very ill, Debeaune was visited by Erasmus Bartholin, whom he entrusted with arranging for the publication of several of his manuscripts. Despite the intervention of Schooten and Huygens in 1656, Bartholin fulfilled his obligations only partially. Of the manuscripts with which he was entrusted, only "La doctrine de l'angle solide construit sous trois angles plans" was discovered, in 1963. The "Méchaniques" mentioned by Mersenne, and the "Dioptrique" that Schooten knew in 1646 are still missing and may be lost.

This situation is unfortunate, for it deprives us of elements valuable for judging the origin of purely mathematical problems that Debeaune formulated in 1638 and that Paul Tannery analyzed fully according to the correspondence he discovered. According to Beaugrand, the first of these problems—which in the present state of textual study appears to concern itself only with the determination of the tangent to an analytically defined curve—interested Debeaune "in a design touching on

dioptrics." As to the second of these problems, the one that has been particularly identified with Debeaune[1] and that ushered in what was called at the end of the seventeenth century the "inverse of tangents" —ie., the determination of a curve from a property of its tangent—Debeaune told Mersenne on 5 March 1639 that he sought a solution with only one precise aim: to prove that the isochronism of string vibrations and of pendulum oscillations was independent of the amplitude. This statement, which is not easily justified except in the language of differential and integral calculus, was fifty years ahead of scientific developments and—by itself—reveals Debeaune's singular ability to translate physical questions into the abstract language of mathematical analysis, despite the inadequacies of the operative means of his time.

It is not surprising that Debeaune, aware of these inadequacies, eagerly seized upon anything that could possibly be of help in overcoming them. As he had once adopted and assimilated Herigone's algebra (the *Cursus mathematicus*, 1635–1637), he welcomed Descartes's Géométrie; and Descartes was right in believing that none of his contemporaries had better understood it. Debeaune's *Notes brèves* clarify and conveniently illustrate some of the difficult passages of the *Géométrie* and played a role in the belated spread of Cartesian mathematics.

As Paul Tannery has shown, Descartes's method for tangents misled Debeaune, at least initially. This purely algebraic method, which consists of determining the subnormal by writing that the equation obtained as a result of an elimination is to have two equal roots, is not susceptible of supporting a process of inversion. But if Debeaune, victim of a misconception that nevertheless bears the stamp of his mathematical genius, could give *his* problem (the first integration problem of a first-order differential equation) only an incorrect solution, he was nevertheless the only one to comprehend the remarkable solution to which it had led Descartes, a solution that anticipated the use of series. This was a remarkable solution that Leibniz, fifty years later, failed to recognize when he replaced it with the aid of new algorithms and the logarithmic function.

Undoubtedly the nature of the various problems posed by Debeaune becomes clearer when translated into the language of Leibnizian calculus, for Debeaune's language, based on the form of the triangle constructed on the ordinate and the subnormal, is without immediacy. Nevertheless, we should remember the man who dared to pose the inversion problem of tangents at a time when mathematicians had difficulty understanding the direct problem.

The example of Debeaune reminds us that mathematics is sustained more by the perception of profound logical structures than by the invention and use of languages that find acceptance in the structures only with time. As Debeaune wrote to Mersenne (5 March 1639), "I do not think that one could acquire any solid knowledge of nature in physics without geometry, and the best of geometry consists of analysis, of such kind that without the latter it is quite imperfect,"[2]

NOTES

1. Find the curve such that *ZY* is to *YX* as a given *AB* is to the difference between *YX* and *AY* (letter of 16 October 1638). Descartes presented a solution in letters to Mersenne and Debeaune of 20 February 1639. There is a transformation of the statement by Descartes in a letter to an unknown person dated June 1645. This statement was followed up by Leibniz and Johann I Bernoulli, who formulated it by means of

In a letter to Debeaune on 30 April 1639, Descartes congratulates himself for having taken the time to consider the proposed curve lines, stating that he has learned a great deal thereby.

2. "Je ne pense pas qu'on puisse acquérir, aulcune cognoissance solide de la nature en physique sans la géométrie, et le plus excellent de a géométrie consiste en I'analyse, en sorte que sans cela elle est fort imparfaicte."

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II. Secondary Literature. On Debeaune or his work, see Charles Adam and G. Milhaud, eds., *Descartes—Correspondance*, I (Paris, 1931), 436–438; Jean Bernier, *Histoire de Blois* (Paris, 1682), pp. 563–568; Pierre Costabel, "Le traité de I'angle solide de Florimond de Beaune," in *Actes du XI^{e} Congrès international d'histoire des sciences*, III (Warsaw, 1965–1968) pp. 189–194; Paul Tannery, "Pour I'histoire du problème inverse de tangentes," in *Verhandlungen der III Internationalen Mathematiker-Kongresses* (Leipzig, 1904), repub., with additions, in Tannery's *Mémoires scientifiques*, VI (Paris, 1926); and Adrien Thibaut, "Florimond de Beaune," in Bulletin de la Société des sciences et lettres du Loir et Cher, **4** , no. 6 (Mar. 1896), 13–29.

Pierre Costabel