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(*b*. Paris, France, 1661; *d*. Paris, 2 February 1704),

mathematics.

The son of Anne-Alexandre de L’Hospital and of Elizabeth Gobelin, L’Hospital served for a time as a cavalry officer but resigned from the army because of nearsightedness. From that time onwards he devoted his energies entirely to mathematics. He married Marie-Charlotte de Romilley de La Chesneiaye, who bore him one son and three daughters.

L’Hospital’s mathematical talents were recognized when he was still a boy. It is reported that when he was only fifteen years of age he solved, much to the surprise of his elders, a problem on the cycloid which had been put forward by Pascal. Later he contributed solutions to several problems posed by Jean (Johann) Bernoulli, among them the problem of the brachistochrone, which was solved at the same time by three others—Newton, Leibniz, and Jacques (Jakob) Bernoulli. His memory has survived in the name of the rule for finding the limiting value of a fraction whose numerator and denominator tend to zero. However, in his own time, and for several generations after his death, his fame was based on his book *Analyse des infiniment petits pour l’intelligence des lignes courbes*(1st ed., 1696, 2nd ed. 1715). Following the classical custom, the book starts with a set of definitions and axioms. Thus, a *variable* quantity is defined as one that increases or decreases continuously while a *constant* quantity remains the same while others change. The *difference* (differential) is defined as the infinitely small portion by which a variable quantity Increases or decreases continuously. Of the two axioms, the first postulates that quantities which differ only by infinitely small amounts may be substituted for one another, while the second states that a curve may be thought of as a polygonal line with an infinite number of infinitely small sides such that the angle between adjacent lines determines the curvature of the curve. Following the axioms, the basic rules of the differential calculus are given and exemplified. The second chapter applies these rules to the determination of the tangent to a curve in a given point. While many examples are given, the approach is perfectly general, that is, it applies to arbitrary curves or to the relation between two arbitrary curves. The third chapter deals with maximum-minimum problems and includes examples drawn from mechanics and from geography. Next comes a treatment of points of inflection and of cusps. This involves the introduction of higher-order differentials, each supposed infinitely small compared to its predecessor. Later chapters deal with evolutes and with caustics. L’Hospital’s rule is given in chapter 9.

The *Analyse des infiniment petits* was the first textbook of the differential calculus. The existence of several commentaries on it—one by Varignon (1725)—attests to its popularity. The question of its intellectual ownership has been much debated. Jean Bernoulli, who is known to have instructed L’Hospital in the calculus about 1691, complained after L’Hospital’s death that he (Bernoulli) had not been given enough credit for his contributions. L’Hospital himself, in the introduction to his books, freely acknowledges his indebtedness to Leibniz and to the Bernoulli brothers. On the other hand, he states that he regards the foundations provided by him as his own idea, although they also have been credited by some to Jean Bernoulli. However, these foundations can be found, less explicitly, also in Leibniz, although Leibniz made it clear that he did not accept L’Hospital’s Platonistic views on the reality of infinitely small and infinitely large quantities.

At his death L’Hospital left the completed manuscript of a second book, *Traité analytique des sections coniques et de leur usage pour la résolution des équations dans les problèmes tant déterminés qu’indéterminés*. It was published in 1720. L’Hospital had also planned to write a continuation to his *Analyse des infiniment petits* which would have dealt with the integral calculus, but he dropped this project in deference to Leibniz, who had let him know that he had similar intentions.

L’Hospital was a major figure in the early development of the calculus on the continent of Europe. He advanced its cause not only by his scientific works but also by his many contacts, including correspondence with Leibniz, with Jean Bernoulli, and with Huygens. Fontenelle tells us that it was he who introduced Huygens to the new calculus.

According to the testimony of his contemporaries, L’Hospital possessed a very attractive personality, being, among other things, modest and generous, two qualities which were not widespread among the mathematicians of his time.

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L’Hospital’s principal works are *Analyse des infiniment petits pour l’intelligence des lignes courbes*(Paris, 1696; 2nd ed., 1715); and the posthumous *Traité analytique des sections coniques et de leur usage pour la résolution des équations dans les problèms tant déterminés qu’indéterminés* (Paris, 1720).

On his life and work, see the *éloge* by Fontenelle tn the *Histoires* of the Paris Academy of Sciences for 1704, p. 125, and in Fontenelle's *Oeuvres diverses*, III (The Hague, 1729); J. E. Montucla, *Histoire des mathématiques* II (Paris, 1758), 396; O. J. Rebel, *Der Briefwechsel zwischen Johann (I.) Bernoulli und dem Marquis de l'Hospital* (Heidelberg, 1932); and P. Schafheitlin, ed., *Die Differentialrechnung von Johann Bernoulli aus den Jahren l691-1692*, Ostwalds Klassiker der Exacten Wissenschaften no. 211 (Leipzig, 1924).

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