Lucas, François- | Encyclopedia.com

Complete Dictionary of Scientific Biography COPYRIGHT 2008 Charles Scribner's Sons
3 minutes

---

b. Amiens, France, 1842; *d*. Paris, France, 3 October 1891)

number theory, recreational mathematics.

Educated at the École Normale in Amiens, he was first employed as an assistant at the Paris Observatory. After serving as an artillery officer in the Franco-Prussian War, he became professor of mathematics at the Lycée Saint-Louis and the Lycée Charlemagne, both in Paris. He was an entertaining teacher. He as a result of a trivial accident at a banquet; a piece of a dropped plate flew up and gashed his cheek, and within a few days he succumbed to erysipelas.

In number theory his research interest centered on primes and factorization. He devised what is essentially the modern method of testing the primality of Mersenne's numbers, his theorem being as follows: The number $M_p = 2^p - 1$, in which p is a prime, is itself prime if and only if $S_{p-1} = 0 \bmod M_p$, where S belongs to the sequence $S_1 = 4$; Using this he was able in 1876 to identify $2^{127} - 1$ as a prime.

The first new Mersenne prime discovered in over a century, it is the largest ever to be checked without electronic help. He loved calculating, wrote on the history of mechanical aids to the process, and worked on plans (never realized) for a large-capacity binary-scale computer. He did some highly original work on the arithmetization of the elliptic functions and on Fibonacci sequences, and he claimed to have made substantial progress in the construction of a proof of Fermat's last theorem.

Lucas' many contributions to number theory were balanced by extensive writings on recreational mathematics, and his four-volume book on the subject remains a classic. Perhaps the best-known of the problems he devised is that of the tower of Hanoi, in which n distinctive rings piled on one of three pegs on a board have to be transferred, in peg-to-peg single steps, to one of the other pegs, the final ordering of the rings to be unchanged.

BIBLIOGRAPHY

I. Original Works. A comprehensive bibliography of 184 items is appended to Duncan Harkin, "On the Mathematical Works of Francois-Édouard-Anatole Lucas,"in *Enseignement mathematique*, 2nd ser., **3** (1957), 276–288. Only the 1st vol. of Lucas' projected multivolume *Théorie des nombres* (Paris, 1891) was published. See also *Recreations mathématiques,* 4 vols. (Paris, 1891-1894; repr. Paris, 1960).

II, Secondary Literature. Lucas' most important contributions to number theory are synopsized in L. E. Dickson, *History of the Theory of Numbers*, 3 vols. (Washington, 1919-1923)—see esp. vol. I, ch. 17. Harkin's article (see above) is also informative in this respect.

Norman T. Gridgeman