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The Origins of the Word “Martingale”

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Translated from the French by Ronald SVERDLOVE²

Abstract

– This short note reviews and details various senses of the word “martingale,” with their respective etymologies, in mathematics, gambling, technology, and vernacular language.

Keywords – martingale, harness, lexicography.

An old man, who had spent his life looking for a winning formula (martingale), spent the last days of his life putting it into practice, and his last pennies to see it fail. The martingale is as elusive as the soul.

A. Dumas père, *Mille et un fantômes*, 1849

1 Introduction

“A financial market is viable (i.e., does not offer arbitrage opportunities) if and only if there exists a probability measure under which the realized

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prices are martingales.” This fundamental result of financial mathematics demonstrates, if need be, that the notion of a martingale remains relevant even sixty years after its formalisation. The definition now plays an important role in all advanced courses, but the etymology of the word remains obscure. In order to see the level of confusion about its lexicographic origins, it suffices to recall some stories about the famous probabilists J. Doob and J. Hammersley:

J. Doob, the founding father of the theory of martingales, has often told of his surprise on opening a package sent by one of his old students, the now well-known P. Halmos. Inside, he finds a strap with a strange form: it is a long leather belt that bifurcates, at one end, into two strips of the same length. Once over the surprise, Doob investigates and learns the explanation for this rather unusual present: the word martingale also applies to the horse gear he is holding in his hands.³

J. Hammersley will have the same revelation a few years later: in 1965, he presents at the Berkeley symposium [17] a study of stochastic processes satisfying a conditional expectation property that resembles the probabilistic definition of martingales. Diving into a dictionary, he discovers the equestrian meaning. Thinking that the mathematical sense originates from it, he baptises the processes he has just introduced “harness processes”.

These two episodes from the history of probability (among others) demonstrate both the level of confusion about the word “martingale” and its various meanings, and the interest of the community of probabilists in the question. As different etymological dictionaries are not always in agreement, this note collects and discusses information about the various meanings of the word and their respective lexicographic origins.

The text has a didactic rather than a literary structure. Starting with the mathematical sense of the word, each section makes an assertion and proceeds to justify it.

2 From the probabilistic martingale to playing games

For probabilists, martingales are first of all integrable processes, satisfying a particular conditional expectation property. Aside from their role in finance, mentioned in the introduction, they have applications to various stochastic and analytic problems and represent, with Markov processes, one of the most important types of processes depending on the past [38, 25]. The notion seems to arise quite directly from the idea of strategy in a game of chance. Although the intuitive understanding that no strategy in an unfavorable game always wins arose very early (B. Bru traces the first elements of this result back to Xenophon [4]), one has to wait until the beginning of the 20th century to obtain a formalisation of the notions and of the problem, partly resulting from a debate about axioms for probabilities initiated by R. von

³Reported in [34].

Mises. After this, the pioneers⁴ of the concept of martingale are S. Bernstein, P. Lévy, J. Ville, E. Borel⁵ and J. Doob. However, looking back, one can find first examples of martingales in older works such as those of Pascal on the decision problem, as explained by Y. Derriennic [12]).

As far as the origin of the word (and not the concept) is concerned, the first citation is found in the thesis of J. Ville⁶ [Note that the word was introduced in chapter IV, third paragraph, in the expression “game system or martingale” but that starting in the following chapter, J. Ville totally abandons the expression “game system” and keeps only “martingale”]. He makes clear elsewhere [37] that this name is borrowed directly from the vocabulary of gamblers. In fact, at the time it was not unusual for gamblers claiming to have a sure winning strategy to speak to probabilists; J. Ville himself met a certain Mr. Parcot, who analyzed roulette results to obtain his allegedly winning strategy or martingale. The word was thus familiar to probabilists and was naturally transferred to the mathematical concept of which the first examples came from games.

Before ending the first stage of this complex lexicographic journey, it is appropriate to note that the English term stems from its French homologue; in fact, J. Doob⁷ explains that he had been asked to review the thesis of J. Ville and that from there he adopted this word for his book, now considered a classic [14].

3 Are martingales absurd?

The next step seems more subtle: where does the term used by gamblers come from? The entry for martingale the dictionary of the Académie Française was introduced in the fourth edition [1]: “To play the martingale is to always bet all that was lost”. A longer entry appeared in the sixth edition. The “Datations et documents lexicographiques” [13], give as an older citation an episode in Casanova’s memoirs [6]: “I went [to the casino of Venice], taking all the gold I could get, and by means of what in gambling is called the martingale I won three or four times a day during the rest of the carnival.”

Going further back, the dictionary of the abbé Prévost [28], from 1750 on, gives a definition, limited to Faro, describing the strategy in which the gambler doubles his stake at each loss “in order to quit with a sure profit, provided that he wins once”. This strategy is often called “D’Alembert’s martingale”, although nothing earlier associates the illustrious encyclopedist to this method of gambling. These references take us back to the beginning of the 18th century but leaves the etymology mysterious.

⁴For a complete study, see [9].

⁵See [5].

⁶After several adventures, (including taking a job teaching preparatory classes in a lycée), Ville published his work as [36].

⁷See [35]; J. Doob also explains in this paper why he didn’t use the word “supermartingale” in his famous book [14].

A very slim trail seems to indicate a derivation of the word from the Provençal expression⁸ *jouga a la martegalo*, which means “to play in an absurd and incomprehensible way”. One can easily understand that the strategy of doubling the stake might have seemed absurd for players who lived before the Age of Enlightenment, who adamantly believed that bad luck was a sign of fate,⁹ but few French sources support this hypothesis. The information comes from across the Channel: the French-English dictionary of R. Cotgrave [8] mentions the expression “à la martingale” with the meaning “absurdly, foolishly, untowardly, grossly, rudely, in the homeliest manner” and even quotes the use of the expression “philosopher à la martingale” (philosophize in a martingale or absurd manner). This gives additional support to the hypothesis just put forward, that it is not merely the gamblers’ word that was borrowed from the Provençal language: for example, the game of cards called Baccara(t) takes its name from a Provençal expression meaning “going bankrupt”. Having found some substance in this lead, we need to follow it further.

4 An excursion through the region of Martigues

Having reached a new stage in this quest, it is now necessary to understand the origin of the expression *jouga a la martegalo*. Further examination of Frédéric Mistral’s Provençal dictionary shows that the word *martegalo* also refers to the residents of Martigues, to whom is attributed a certain “gaping”, “naïveté”, “banter”. “Le Martigue” then designated the pond of Berre, which gave its name to the city created on April 21, 1581, by the merger of the three boroughs¹⁰ bordering the opening to the Gulf of Fos. The isolated situation of this area “has brought to its residents a proverbial reputation for naïveté”.

For completeness, it must be said that the source of the place name is debatable: the authoritative explanation [30] is *Stagnum Marticum*, the pond of stones, but there are other more or less farfetched theses. The place name might derive from an ancient city, a priestess, a Roman general...

Step by step, Martigues emerges as the destination of this first quest.

5 Other meanings connected to the Martigues area

Before attacking the equestrian meaning, we make a brief digression on several meanings of the word “martingale”, more or less directly associated with the region of Martigues.

- The martingale garment worn by Rabelais’ Panurge is a pair of pants with an opening at the back (in Rabelais’ words, “a drawbridge on the

⁸For all the assertions about the Provençal language, see [27].

⁹Pascal’s ideas on probability, principally related to his famous wager on the existence of God, were not yet widespread.

¹⁰Ferrières, Jonquières and L’isle.

ass that makes excretion easier” [29]). The use of this garment seems to have been quite widespread; Brantôme [3] confirms, a century later, that François I¹¹ wore such clothes: “This brave knight had to have a bowel movement every time he wanted to begin fighting and therefore usually wore martingale pants.”

La Curne’s Old-French Dictionary [10] states that the fashion originated in Martigues, but that these pants “were still in fashion around 1579 among the minions of the court, who used them for many other purposes than the one for which they were created.” The word remains in use to describe a half-belt in the back (which can still be seen on some jackets and also in fencers’ outfits). It seems difficult to ascertain whether these clothes are typical of the area of Martigues, as Ménage asserts [26] in the entry *martingale*, or if they are associated with it for their absurd nature. Nonetheless, the use of expressions such as “dress of the Spanish, Italian, and particularly Neapolitan, Flemish or martingale styles”¹² between the 16th and the 18th centuries suggests that the word martingale would be used in this case to designate directly the customs of a people.

- The word martingale is also associated, in a more anecdotal way, with a sailors’ dance¹³ still taught by some folkloric dance associations. It seems that this dance consists mainly in repeatedly stamping the ground roughly with the heel. It has remained little known, even though the report on the voyage of Charles IX and his court to Brignoles (November 25, 1564) states that “the citizens tried to please him through the gentleness of the dances of the area [...], dances named “volte” or “martingale”.¹⁴

A. Dumas, in his picturesque trip through Provence [15], reports a related usage that has not been corroborated: “The Provençaux, to say “dance well”, say “dance in the martingale style”.

- Still more picturesquely, a prophetess from Provence named Claude Scotte called herself La Martingale (or Martingalle) in her correspondence between 1617 and 1628. Her letters are full of Provençal quatrains, of visions, and of doubtful predictions (groups of angels and holy apparitions for the future maternity of the queen, military victories for the Duke of Guise, various honours and rewards for less titled correspondents). An heir to the throne, the future Louis XIV, will arrive only in 1638, more than ten years later. La Rochelle, demolished by

¹¹King of France, 1515–1547.

¹²In the entry *grégues* of [26].

¹³Mentioned by Cotgrave[8] but missing from the canonical dictionary, T. Arbeau’s *Orchesography*. Its location is revealed by its earliest citation, in the work of a Provençal jurist [2].

¹⁴Quoted in [21].

Richelieu in 1628, will be conquered many years after the prediction of the unfailing martingale. The contemporary reader will notice that these letters are always punctuated by requests for a pension or donations and by anecdotes showing the (self-proclaimed) pious and devout life of la Martingale. Thus, there are a great number of petitions such as: “your Majesty will take into consideration the services rendered to France by Martingale” [32].

- Finally, the word *martegalo* also refers to a sailboat and to “a rope attached above the bowsprit for securing the flying jib”. It is not surprising that the famous sailors called “martégaux” gave their name to these objects. Numerous documents, including [11] and [33], testify to the boldness and talent of the martégaux for net fishing, which they practiced as far away as the south of Italy and Andalusia. But the rope raises further questions.

6 Reconciliation with harnesses

In fact, this rope, adjusted in scale, resembles so closely what the horsemen call a simple martingale (like the one P. Halmos gave J. Doob) that it can be mistaken for it: it is a strap that starts from the noseband and runs the length of the horse’s belly before separating in two to join the saddle girth on each side of the animal. The martingale keeps the animal from turning its head and allows the rider to have his hands free (to play polo, or use a weapon...). This saddlery article is quite old (Hammersley’s references trace it back to the Assyrians) but, once again, this note is mainly concerned with the origin of the name, rather than of the object itself. The various dictionaries previously referred to almost all mention this meaning, without ever supplying a convincing etymology. The oldest citation seems to have come from an Italian-English Dictionary [16]. Starting there, any philologist, no matter how scholarly, is reduced—for lack of new information—to conjecture: does the name stem from the analogy with the Mediterranean sailors’ rope? Is it a fortuitous similarity of sound (originating from a lexical association) in Provençal between a local expression and an ancient word from another Mediterranean language? Or should we be still more bold (too bold?) and consider a new thesis for the origin of the place name Martigues (the name would then derive from tanners living along the shore of the pond in the Middle Ages)? Presently it is impossible to answer these questions categorically.

On the other hand, this clarifies the meaning of the restraint that Victor Hugo tells us was called a martingale in prisons: it goes from the neck, divides over the stomach and joins the hands after passing between the legs [19]. Indeed, little doubt is possible: this meaning¹⁵ goes back to the horse

¹⁵This is not a metaphor by the great poet. Rather, it is another entirely different

gear.

7 Opinions on the Spanish *almartaga*

Many dictionaries (surely following the English lexicographer Mayhew [24]) propose the Spanish word *almartaga*, of Arabic origin, as the etymology of the word martingale. This word is still in use in Spanish, where it refers to a bridle used by the rider to dismount rather than to a strap that bifurcates under the animal. However, the Spanish lexicographer J. Corominas [7] refutes this appealing hypothesis; in fact, as the word *almartaga* is only found in Castilian, it must have originated on Iberian soil, where the use of martingale to designate the strap has never been seen. Beyond this first inconsistency, Corominas also provides more sophisticated arguments concerning the use of Arabic suffixes in the creation of Castilian words, which tend to show the impossibility of an etymological tie between *almartaga* and martingale.

8 Prostitutes: The ultimate treachery of martingales

Before concluding this lexicographic journey around martingales, we must still examine one last long forgotten meaning. In fact, the word martingale was also used in the vernacular to refer to courtesans, street-walkers, women of low virtue, and other prostitutes. This meaning, which we can find in old slang dictionaries [18, 22], is the one that explains the three occurrences of the word martingale in Scarron's *Virgile travesti* [31]. Yet at this stage, we cannot say anything about the origin of this last meaning. This is the ultimate treachery of martingales!

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