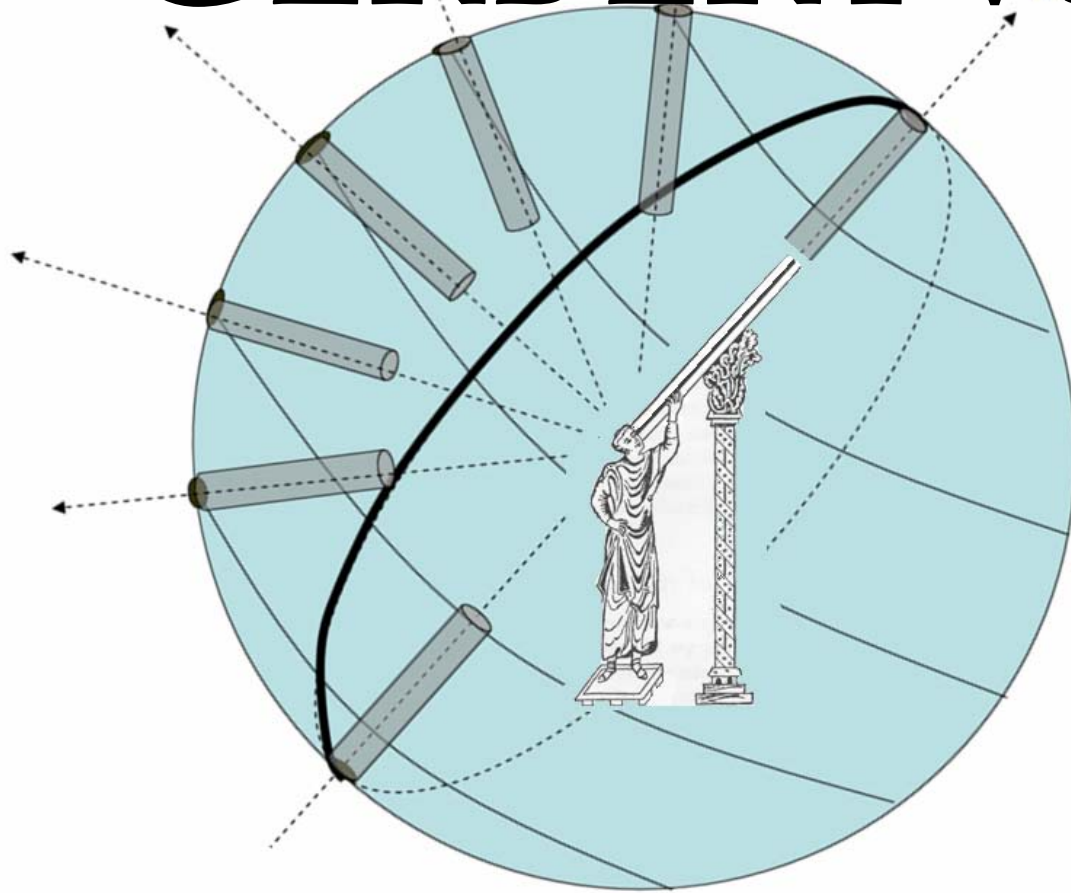# GERBERTVS

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Mathematical games in Europe around the year 1000

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Abstract

There are strong reasons to relate Gerbert with games as it is shown in my text "Teaching and playing 1000 years ago, Rithmomachia". This paper addresses the question: which board games could Gerbert have played? There are also astronomical games.

Sommario

Ci sono forti ragioni per collegare Gerberto con i giochi matematici in Europa attorno all'anno mille, come già è stato messo in evidenza nel testo "Insegnare con il gioco 1000 anni fa". Questo articolo risponde alla domanda: quale gioco da tavolo Gerberto può aver giocato? Ci sono anche giochi astronomici.

This paper addresses the question: which board games could Gerbert have played? There are strong reasons to relate Gerbert with games, as we showed already in [12].

Dice have always been very popular, but we don't think this primitive form of play would attract Gerbert's intellect ([2, 7, 10, 11]).

Arabs brought *Alquerque* to Europe, which became very popular.

This forefather of the actual *Checkers/Draughs* game used a lined board and the action happened on the intersections.

Figure 1 Dice and astragals

Each player, on his turn, could move a piece to an adjacent empty intersection, along one of the marked lines. Captures used the small jump method and could take multiple jumps and captures. The first capture was mandatory.
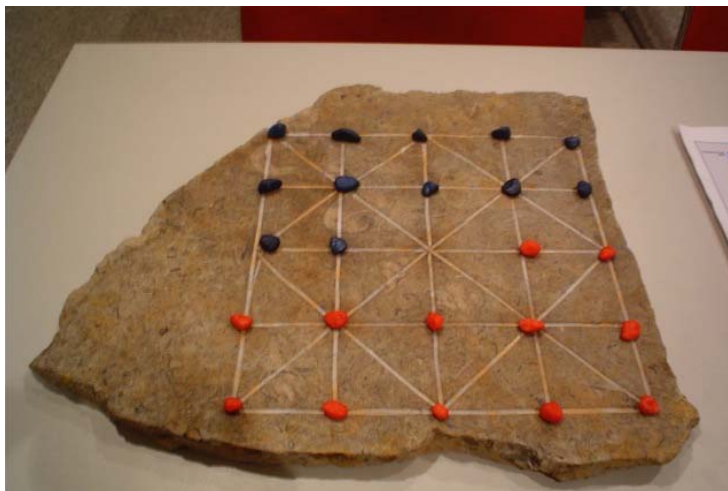
Figure 2 Alquerque board and pieces in starting position

A player wins a game if he captures all his opponent's pieces, or blocks all his movements. If none of these situations

looks attainable the winner is the player with more pieces on the board.

Games of Dice and *Alquerque* are treated in the main source on medieval games: the magnificent book that Alfonso X commissioned in 1283 ([1]).

Figure 3 A, B: Dice and Alquerque in Alfonso's book

Nine Men Morris, also played on the intersections of a ruled board, has its remote origins lost in time. Pieces move along the lines to adjacent empty intersections. Belonging to the family of alignment games (typically *three in a row*), each time a player occupies a straight segment with three of his pieces, he is free to choose one enemy piece to throw out of the board. Whoever sees his pieces reduced to three, looses.
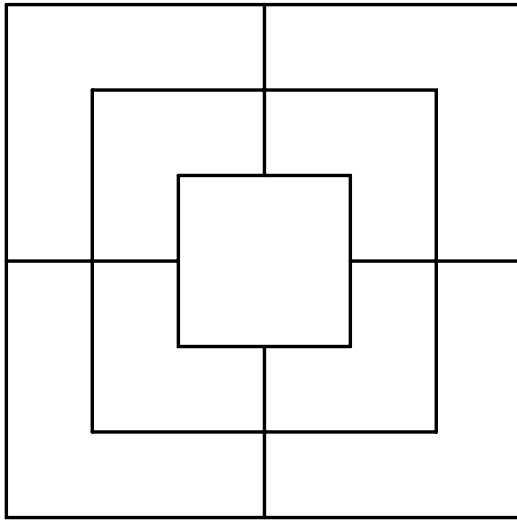
Figure 4 Schematic Nine Men Morris board

Chess was also brought by the Arabs from the East to Europe. Originally, the game of chess represented a battle, with its soldiers, elephants and men on horses. In Europe the names and shapes of the pieces evolved and eventually emulated the medieval society, with Kings, Queens, Bishops, Knights and peasants ([9]).
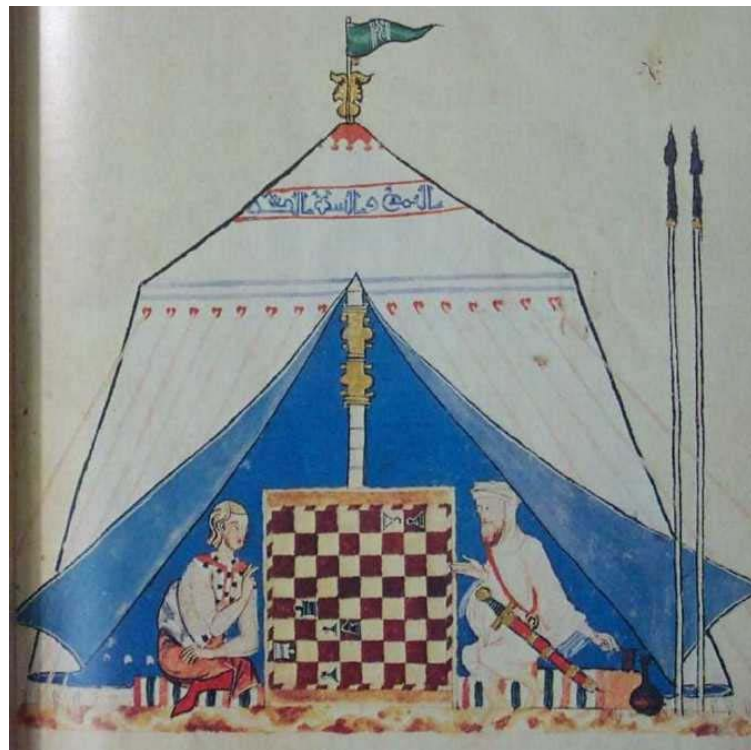
Figure 5 Illustration of a chess game in Alfonso X's Book of Games

the course of time. On Gerbert's times, the game was slow, lacked drama, and was sometimes played with dice (to decide which piece to move) to increase the interest and doubts on the outcomes of the games. Nevertheless, it was played and praised by intellectuals.

Alfonso describes several variants of chess, some of which were played on boards of dimensions other than 8x8.

The game of Backgammon, very popular today, has its origins in Ancient Babylon. At the beginning of the previous century, close to Ur, archeological

Figure 6 The Royal Game of Ur

field explorations unearthed several sets of boards and pieces of a magnificent game, which apparently had been buried with their wealthy owners ([9, 11]).

This game, played some 4500 years ago, is essentially a race, the winner being the player who finishes the trail with his pieces first. The dice had a Particular shape: they were triangular pyramids. The exact rules to play this game were found in two clay tablets and translated by I. Finkel. Thus, this is clearly the oldest game we can play according to its original rules!

The *Game of Twenty Squares*, or *Senet*, was popular in Egypt 2500 years ago. Its rules are believed to be different from the Royal Game of Ur, but the nature of the game is the same: a race.

Figure 7 The Game of Senet, a modern board

The British Museum exhibits remarkable exemplars of both games.

In Rome, *Duodecima Scripta* followed the same principles of a race game between two teams. In the Middle Ages, the game of Tables looked already like our Backgammon.

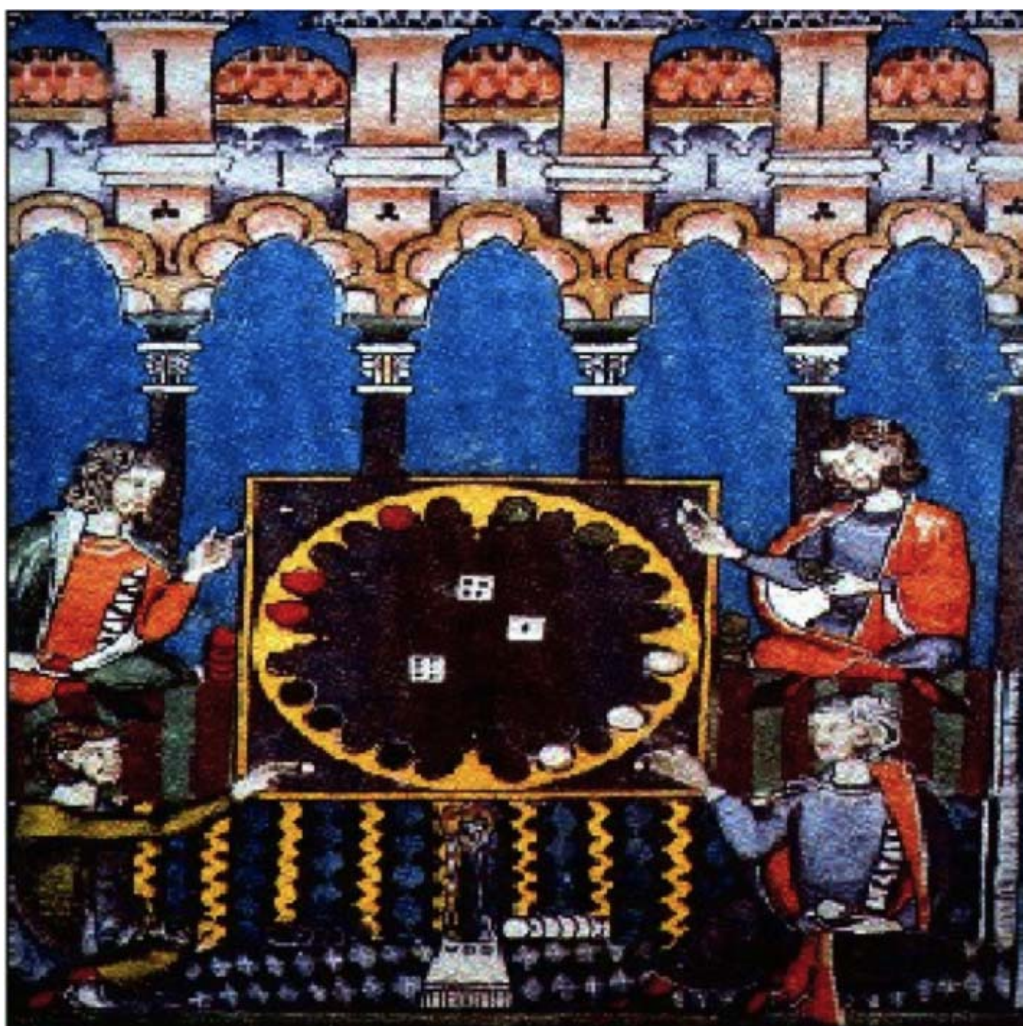**Figure 8 Schematic board of Duodecima Scripta**

Figure 9 One variant of Tables in Alfonso X's Book of Games

There were several variants of Tables as well.

These games used, besides the players' tokens, cubic dice. The rules are based on the movement of the pieces according to the throws of the dice. Pieces that lay alone in one position can be thrown out of the board and have to start the trail from the beginning again.

Figure 10 Ludus Astronomorum

Ludus Astronomorum, a game for seven players based on the Ptolemaic Astrology was addressed in Alfonso's Book of Games as well. This game, also introduced in Europe by the Arabs, was a representation of the sky and its seven "planets". Interested in Astronomy as Gerbert was, it is almost certain that he knew this game. *Ludus Astronomorum* was popular for several centuries. Based on it, William Fulke, in the 16th century, invented another astronomical game. Fulke named it *Ouranomachia* ([5]) and meant it to be a scientifically updated version of the astronomy game.

By the end of 10th century, while dice games were banned by the Church, the priest Wibold, in Noyon, South of France, managed to create a thematic dice game with a virtuous theme. *Ludus Regularis*'s description reached us due to fortunate circumstances ([6]).

ut quater replicatæ eundem æquiparent , eo tamen tenore ,
ut in prima ᴀ , in secunda ᴇ , tertia i , ab asse incipiens ,
directo semper scribatur tramine , et eodem apice finiantur
ita :

		o		a	e			u		e	- i				a		i	o
a			u		i		e			a		o		i		e			u
				a	o	u					e	u	a					i	a	e
e	e		i	a	e	i		i	o	e	i		o		o	u	i	o
					i	o					o	u						u	a
	i	o		u	u	a			o	u	a	a	e		u	a	e	e	i

His ita dispositis , volumus ut per has tres, sicut et in
præfato solet ludo , numeri qui supputandi sunt , prout
sors dictaverit suo semper ordine requirantur. Y vero sex-
tam achivamque vocalem, (non solum , quod modo eadem
minime indigemus lingua , et nostratum regulas ortho-
graphorum ad plenum non observamus , sed quia com-
pendiose operis studemus , vulgariterque nostri ridiculum
exercere) prætermisimus. Cæterum consonantes, quoniam
sedecim in alphabeto remanent excepta ǫ , quam gramma-
tici supervacuam nominant, quamque ideo non annume-
ravimus , quia ex currente sibi socia , videlicet ᴜ, sine qua
vim litteræ amittit, perfacile hic comprehendi potest , et
septenus decimus numerus ad peragendum quod voleba-
mus , quasi embolissimus videbatur. Igitur sicut vocales
tetragonis, ita consonantes uni tantummodo trigonæ py-
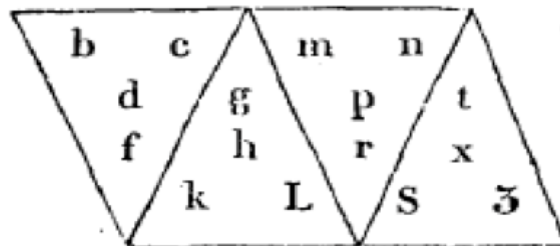ramidi , quæ quatuor superficies haberet, inserere opor-
tet , ita :

Figure 11 A page of Le Clay

This game used three cubical dice with vowels in the place of the usual dots, and a tetrahedral die with consonants. As there are 56 ways of throwing the cubic dice, Wibold listed 56 virtues. His list starts:

1. 1. 1. Karitas.3.
1. 1. 2. Fides.4.
1. 1. 3. Spes.5.
1. 1. 4. Justitia.6.
1. 1. 5. Prudentia7.
1. 1. 6. Temperantia.8.
1. 2. 2. Fortitudo.5.
1. 2. 3. Pax.6.
1. 2. 4. Castitas.7.
1. 2. 5. Misericordia.8.
1. 2. 6. Obedientia.9.
1. 3. 3. Timor.7.

Throwing the dice the players tried to match number and letters of virtues. If they did, those virtues would become theirs. Two virtues with numbers adding up to 21 were considered linked and some special rules applied to them. It is worth to note that these two numbers (56, 21) appear in several other games throughout history (for example, in Tarot there are 56 minor arcana and 21 numbered major arcana). Wibold elaborates on his choices of numbers for the virtues. His approach is essentially Pythagorean.

We do not know how popular this game was, it was created in the 10th century by a monk, thus it is likely that it

was practiced in some monasteries and churches. Did Gerbert ever play *Ludus Regularis*?

We addressed the game *Rithmomachia* elsewhere ([12]). This mathematical game was invented to teach arithmetic in the beginning of the second millennium and it is clearly related to Gerbert. As Coughtrie puts it ([4]), its inventor had to be familiar with Gerbert's works. Did Gerbert, or one of his followers, invent *Rithmomachia*? Did Gerbert ever played the game? Boissière ([3]) lists him as one of the famous players of the past, but this does not seem to be reliable.

It is natural to expect that someone who innovated teaching practices and created new calculation devices, as Gerbert did, fond of mathematical games, but harder evidence is lacking at this moment to conclude that Gerbert really focused his attention on board games.

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