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The loop within circular three mens morris

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introduction by Ulrich Schädler

Abstract *The circular version of "three men's morris" — a simple kind of nine men's morris— is considered as one of the board games of ancient Rome. Its rules have been reconstructed from different sources, such as game boards carved into stone floors and two short passages in Ovidius. The game includes a cycle consisting of only eight situations, which appears already in everyday playing and which is proved in this article. Since the reconstructed rules lead to a game which only works when one of the two players makes a big mistake, doubts can be raised as to the existence of such a game in Roman times.*

Zusammenfassung *Die Rundmühle — eine einfache Mühleform — gilt als eines der Brettspiele des antiken Rom. Seine Regeln wurden aus verschiedenen Quellen, wie etwa in Fußböden eingeritzten Spielbrettern und zwei das Spiel beschreibenden, kurzen Textstellen Ovids, rekonstruiert. Die Rundmühle enthält einen Kreislauf aus nur acht Situationen, der schon im alltäglichen Spiel zum Tragen kommt und der in diesem Artikel nachgewiesen wird. Da also die rekonstruierten Regeln ein Spiel vorschlagen, das nur dann funktioniert, wenn einem der beiden Spieler ein grober Fehler unterläuft, mögen Zweifel gerechtfertigt sein, dass ein solches Spiel in römischer Zeit überhaupt existiert hat.*

Introduction

Since, in the wake of a growing interest in Roman daily life, in the 1970s, educators working in archaeological museums have discovered Roman games, the so-called "circular merels" or "wheel-type mill" holds an unmitigated triumph. Given the number of "wheel patterns" carved into the floors of

Roman streets and squares, the game is considered to be one of the most popular board games of the "Romans", if not the only board game of which the rules have come down to us. Various commercial versions of the game can be bought in museum shops.

In his "A History of Chess" published in 1913, Murray illustrated — in a somewhat contradictory form — such a circular game board "for the Smaller Merels" next to the square one, although he had to admit that its "purpose is unknown" (Murray 1913: 614). It was Carl Blümlein who in 1918 proposed detailed rules of the game of the "wheel-type mill" ("Rundmühle" or "Radmühle" in German), along with a sample game in his "Bilder aus dem römisch-germanischen Kulturleben". In order to explain a figure showing a game board in the form of a circle crossed by four intersecting lines, Blümlein wrote (Blümlein 1918: 101-102): "3 counters belong to each game that have to be brought into a straight line; e.g. Black begins and then the players take turns placing the counters on AA', BB', CC'. After they have to move; after 6 moves Black will, according to Fig. a, have won with his 7th move" ("Zu jedem Spiele gehören 3 Steine, die man in eine gerade Linie zu setzen sich bemühen muss, z.B. Schwarz beginnt, und nun setzen die Spieler abwechselnd AA', BB', CC'. Nun muss gerückt werden; nach 6 Zügen wird bei Fig. a z.B. Schwarz mit dem 7. Zuge gewonnen haben").

Patterns in the form of a wheel with 8 spokes, i.e. circles crossed by four intersecting lines or just eight points on the circle, are often found carved into the marble floors of Roman buildings and squares. The best-known example is the Basilica Iulia at the Forum in Rome. But they can also be identified in Ephesus or Aphrodisias, for example, in large numbers. But what had not been done before Blümlein to my knowledge, was to interpret these patterns as a circular variant of the square "three men's morris" and to connect them to two verses of the Roman poet Ovidius (43 BC – 18 AD) reading:

> "Parva sit ut ternis instructa tabella lapillis
> in qua vicisse est continuasse suos" (Tristia II, 481-2)
> how a small board is provided with three counters a side,
> and winning lies in keeping them together

and

> "parva tabella capit ternos utrimque lapillos
> in qua vicisse est continuasse suos" (Ars Amatoria III, 365-66)
> a small board presents three stones each on either side
> where the winner will have made his line up together.

By interpreting Ovidius's lines, which until then philologists had hardly understood (cf. Marquardt-Mau 1886: 859 with note 2; Becker-Rein 1863: 340) as a description of the mechanism of capture of a morris game and transferring it to the circular "boards", the Roman circular merels were born.

Though the "circular merels" are not, the square shape of the "smaller merels" is, described in the "Book of Games" by the Spanish King Alfonso X from 1284 (Schädler-Calvo 2009: 295-96, 306). While Ovidius unfortunately failed to give the name of the game, Alfonso calls it "Alquerque de tres", which means "Alquerque with three counters". The game board is a square crossed by lines vertically, horizontally and diagonally. The two players have three counters, which they place alternately on one of the nine points of the intersection of the lines, before moving them from one point to a directly adjacent point. The first player to bring three stones in a line, so making a "mill", wins the game. Alfonso also gives a winning strategy for the starting player, a finding that has led to the game being regarded as a children's game, which his illustration emphasizes. Game boards of this shape as well as a simpler version without diagonal lines can be seen in large numbers in Roman cities, so we can assume that Ovid actually had these "smaller merels" in mind.

Blümlein's interpretation prevailed rapidly. Even a critical mind such as Hans Lamer considered "kreisrunde l(usoriae) t(abulae) mit acht Radien für Mühle" as "the only ancient board game from which one can say for sure that it survived". In his eyes only the question whether the circular or the square shape was the original form remained open (Lamer 1927 col. 1987, 2006). Today, Blümlein's and Lamer's views still apply and the existence of "circular merels" in Roman times is taken for granted (Väterlein 1976: 59; 1981 Montesano 2241; Rieche 1984: 20-21). Murray also shared this view, although he preferred not to mention the circular merels in the section about merels games of his "History of Board Games other than Chess" (Murray 1952: 38-40, but 18 Note 3 with Figure 7B).

Nevertheless, the circular form is not attested a morris game - anywhere in the world. As a matter of fact, Murray in the section devoted to the smaller merels in his "History of Chess", was unable to specify any one country where the circular version of the game was ever attested, unlike the case of the square smaller merels (Murray 1913: 614). Moreover, several of those wheel patterns have diameters of more than a metre or depressions at the points, which alone makes it unlikely that such a "wheel" would have served for a small merels game. It is only recently that doubts have been raised by various authors about the use and function of those wheel pat-

terns namely by Charlotte Roueché (2007), who interpreted at least some of the circles as place marks, Ulrich Schädler (paper read at the BGS colloquium 2007 at Sankt Pölten entitled "*Ashtapada* and round smaller merels: two newly invented "ancient" board games?"; see also Schädler-Calvo 2009: 299), and most recently Claudia-Maria Behling (2013) with her suggestion of a tossing game played on those circles.

Is it therefore only a witty invention by Blümlein? Amazingly, no one has yet attempted to analyse the "circular merels" according to Blümlein's rules, as has been done for the "smaller merels" in the Middle Ages and described more completely by Wilhelm Ahrens (Ahrens 1901: 85-89). It is Florian Heimann who discovered and closed this gap. He undertook this analysis as a school project in 2004 and presented it to the Board Games Studies Journal in 2006. We are happy to finally be able to publish this piece of research. He comes to the conclusion that the circular merels as described actually do not work because neither a winning strategy exists nor does the game ever come to an end, unless a player makes a big mistake. In Blümlein's example White commits this error in his 4th move: White should have foreseen that Black with his 5th move would force White to leave the centre, resulting in the immediate victory of Black. A player who moves a piece to the centre point and is therefore left with two instead of three counters on the circle, will find himself in this uncomfortable position. As long as the players avoid this situation, the game will continue without ever coming to an end, as Heimann's analysis demonstrates. It raises the questions: Can a game have existed and enjoyed great popularity even though it does not work? Were other kinds of games played on these wheel patterns? Did the wheel patterns serve completely different purposes, as several authors suggest?

Ulrich Schädler

The basis for circular three men's morris

From ancient times no explicit records of the rules of a game are preserved. The first known collection of rules dates back to the 13th century and has been commissioned by Alfonso X. King of Castilia (Schädler-Calvo 2009). Even though two authors in ancient Rome have written each an essay on games, unfortunately neither the "On the games of the Greek" of Sueton nor the "The art of the dice game" of emperor Claudius are preserved (Rieche 1984: 8). Therefore, the reconstruction of ancient games is complicated and based on findings and assumptions. In the case of the circular three men's

morris, the rules, which are commonly accepted as reconstruction, are based on two assumptions and one follow up assumption.

The first assumption says that the two mentioned passages from Ovidius (Ars amatoria III 365 – 366; Tristitia II, 481-2) refer to the carved circular patterns, which are thus interpreted as game boards in this assumption. However, apart from the not very significant attribute "parva" i.e. "small", the board of the game, which is described in the passages, is not further characterised at all. Thus, the base for this assumption is relatively small.

The second assumption refers to the aim of the game, which Ovidius describes with the word "continuare". It is assumed that the term can be perceived as "to arrange in a line" (Holzberg 1985: 139), which corresponds to the pounding mechanism of nine men's morris. However, this is just one of several possible interpretations of the term. For example, the also possible perception as "not to separate" of different other translators (W. Hertzberg at Hojer 1996: 20; Rieche 1984: 28; Rieche 1986: 45) does not make up any connection to the nine men's morris. If this assumption is correct, the game described by Ovidius and the "little merels" in the form, in which it is described for example at Alfonso X (Schädler-Calvo 2009: 295-96, 306), share the aim as well as the number of counters. Both games use three counters from two players each. Based on these agreements, which are proofed in the case of the number of counters and which are possible in the case of the aim, the follow up assumption claims the two games to share also their other mechanisms. Thus, the follow up assumption claims that the counters in the game described by Ovidius are in turns placed on the board and then moved.

To sum it up, the assumption that the passages from Ovidius refer to some kind or modification of the playing mechanisms of the "little merels" is clearly better supported than the assumption that the known circular patterns are related to these passages. Even though there is nothing to contradict this relation, there is hardly anything to support it. Based on the described assumptions, different authors have designed the rules of the circular three men's morris in the following form and accepted it as reconstruction.

Rules of the game

The board of this simpler variation of today's nine men's morris is a wheel with eight spokes (Fig. 1). The hub of the wheel i.e. the centre of the circle and the eight points, at which the spokes hit the circle, are the nine fields,

at which counters can be placed. Both parties have three counters each. In turns, the counters are first placed on the board and then moved to adjacent fields. Counters can only be placed on or moved to vacant fields. Flying or hopping is not allowed. The party, which first can arrange its counters in a line across the centre, wins the game (Blümlein 1918: 101-102; Rieche 1994: 20; Hojer 1996: 22).
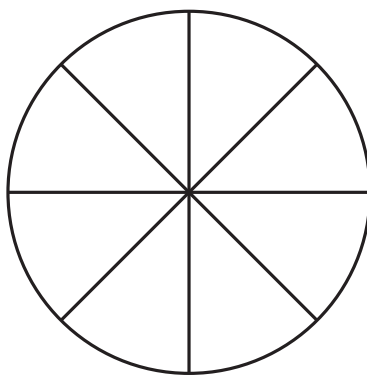

Figure 1: The board of the circular three men's morris.

Proof of a loop

During the first rounds, one can be fascinated by the apparent diversity, which the simple rules can generate on the small board. However soon, one may get the feeling that there are some main situations (e.g. Fig. 3a) which appear more frequently than others or even that the game at flawless play may loop around without ever getting to an end. This guess can be checked by the following analysis:

Given a labelling with clockwise (or counter clockwise) numbers 1 to 8 and 9 in the centre (Fig. 2), it shall be played according to the rules of the circular three men's morris starting from the situation white 1;4;6 and black 2;5;8. White plays. Moves are only allowed if they will neither lead to the loss of the game nor to situations, which have already appeared. That means the new situation may not be transformed to a previous one by any combination of rotation, mirroring or consequent (counters and play) switch of colours. {A possible transformation to a previous situation will be given in curly braces.}
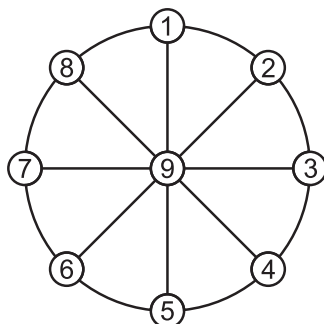
Figure 2: Circular three men's morris board labelling used in this study.

White (w): 1;4;6 black (b): 2;5;8 play(p):w is called situation a) (Fig. 3a). Now, white moves for example w 4 –9.

The new situation w: 1;6;9 b: 2;5;8 p:b is called situation b) (Fig. 3b). The move b 2 –3 would result by w 1 –2 in a loss. However, the move b 5 –4 would result by w 6 –5 in a loss as well. The only move left is b 8 –7.

The arisen situation w: 1;6;9 b: 2;5;7 p:w is called c) (Fig. 3c). It is similar to situation b) {Mirror situation c) along the 3-7-axis and rotate clockwise by 45°}, but now the party plays, which has a counter in the centre i.e. on the 9. If white moves w 9 –3, situation a) would appear again {For (w:1;3;6 b:2;5;7 p:b) consequently switch colours and rotate counter clockwise by 45°.}. The move w 1 –8, would result by s 2 –1; w 9 –2/3/4 and s 7 –9 in a loss. Finally, the move w 9 –8, would result by b 5 –9; w 6 –5 and b 2 –3 in a loss as well. The only move left is w 9 –4.

This situation (w: 1;4;6 b: 2;5;7 p:b) is called situation d) (Fig. 3d). By the move b 7 –8, situation a) would appear again. The move b 2 –9 would result by w 1 –8; b 9 –1/2/3 and w 6 –9 in a loss. The move s 7 –9 lets situation b) arise {For (w: 1;4;6 b: 2;9,5 p:w) consequently switch colours and rotate by 180°}. If black moves b 5 –9, white has to move w 4 –3, as all other moves w 4 –5; w 6 –5 and w 1 –8 would result by b 2 –3 in a loss for white. However, by the moves b 5 –9 and w 4 –3 situation c) would appear again {For (w: 1;3;6 b: 2;7;9 p:b) consequently switch colours and mirror along the 4-8-axis}. Thus b 5 –9 is not allowed either. Black has to move b 2 –3.

The new situation w: 1;4;6 b: 3;5;7 p:w is called situation e) (Fig. 3e). The moves w 1 –2 and w 1 –8 would result by b 5 –9 in a loss. If white moves w 4 –9, black has to move b 3 –2, as all other moves b 3 –4; b 5 –4

and b 7 –8 would result by w 1 –2 in a loss for black. Therefore w 4 –9 is not allowed, as by w 4 –9 and b 3 –2 situation e) would transform back again to situation c). Due to the symmetry of the situation w 6 –9 is not allowed either. (The move w 6 –9 causes b 7 –8, as b 7 –6; b 5 –6 and b 3 –2 result by w 1 –8 in a loss for black. By w 6 –9 and b 7 –8 situation c) appears {Mirror (w: 1;4;9 b: 3;5;8 p:w) along the 1-5-axis}). The only move left is w 1 –9.

By this situation f) (Fig. 3f) appears with w: 4;6;9 , b: 3;5;7 and p:b. Now the two moves b 3 –2 and b 7 –8 are available, which both result neither in a previous situation nor in a loss. For the sake of simplicity, b 3 –2 is analysed first and b 7 –8 will be returned to later on.

Situation g) (Fig. 3g) arises in the form w: 4;6;9 b: 2;5;7 p:w and appears to be the end of a rather short dead end street. The move w 4 –3 would result in situation b) {Rotate (w: 3;6;9 b: 2;5;7 p:b) clockwise by 135°}. The move w 9 –1 would result in situation d). The move w 9 –8 would result in situation e) {For (w: 4;6;8 b: 2;5;7 p:b) consequently switch colours and rotate counter clockwise by 45°}. Finally, the move w 9 –3, would result by b 7 –9; w 6 –7 and b 2 –1 in a loss for white. At this point, the match cannot be continued in compliance with the requirements stated at the beginning.

Even if one would go one step back and return to situation f) (Fig. 3f), the previously possible move b 7 –8 is now not allowed anymore, as it would result in Situation g) {Mirror (w: 4;6;9 b: 3;5;8 p:w) along the 1-5-axis}. The last possibility is to return back to the start and to analyse situation a).

So the starting point is once again w: 1;4;6 and s: 2;5;8 with white at play (Fig. 3a). The move w 4 –9 would result in situation b). Due to the symmetry, the move w 6 –9 is not allowed either, as it would result in situation b) as well {Mirror (w: 1;4;9 b: 2;5;8 p:b) along the 1-5-axis}. If white moves w 4 –3, situation d) would appear again {Mirror {(w: 1;3;6 b: 2;5;8 p:b) along the 4-8-axis and rotate counter clockwise by 45°}. The symmetry clearly shows that w 6 –7 is not allowed either, as it would result in situation d) as well {Rotate (w: 1;4;7 b: 2;5;8 p:b) counter clockwise by 135°}. Thus, w 1 –9 is left as the only possible move.

Situation h) (Fig. 3h) with w: 4;6;9 b: 2;5;8 and p:b appears on the board and represents the eighth and last situation of this study. The move b 8 –7 would result in situation g). Due to the symmetry, the move b 2 –3 would result in situation g) as well {Mirror (w: 4;6;9 b: 3;5,7 p:w) along the 1-5-axis}. The move b 2 – 1 would result in a loss for black by w 6 –7; [b 1 –2 or b 5 –6] and w 4 –3. Due to the symmetry this is also valid for b 8 – 1 (for the sake of completeness: b 8 –1; w 4 –3; [b 1 –8 or b 5 –4]; w 6 –7 loss
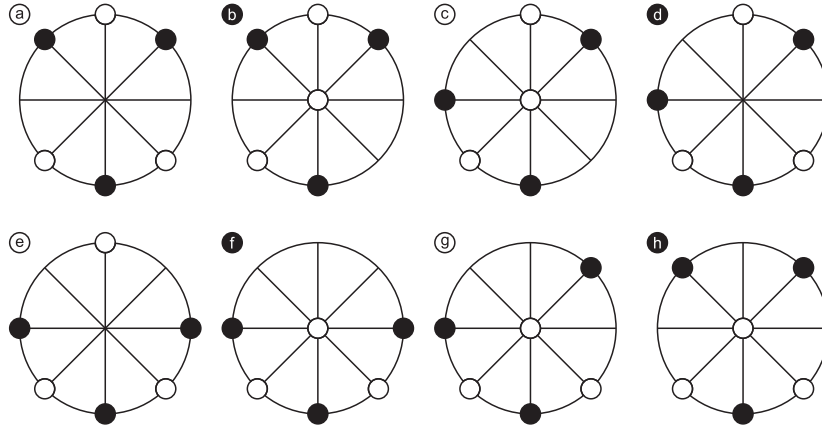
for black).

Figure 3: Eight situations (a-h) of the loop within the circular three men's morris described in this study. The label backgrounds indicate the play.

By this, the initial guess is proved to be correct. Within the circular three men's morris in the form, in which it is described in the archaeological literature, exists a loop of the following eight situations (Tab. 1). This loop takes effect also in everyday playing, as it was everyday playing, in which it has been discovered.

Table 1: Eight situations (a-h) of the loop within the circular three men's morris described in this study.

Situation	White	Black	Play
a	1 4 6	2 5 8	White
b	1 6 9	2 5 8	Black
c	1 6 9	2 5 7	White
d	1 4 6	2 5 7	Black
e	1 4 6	3 5 7	White
f	4 6 9	3 5 7	Black
g	4 6 9	2 5 7	White
h	4 6 9	2 5 8	Black

Using the results of this study to draw conclusions e.g. that the circular three men's morris has been reconstructed in a wrong way and never existed

in the presented form or that the Roman art of playing allowed for a game, which at flawless play does not reach any end, goes beyond the scope of this article and is left for future research.

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Board Games Studies was first published in 1998, an initiative inspired by the colloquia on board games held at Leiden University, the Netherlands, in 1995 and 1997. Five institutions affiliated themselves with the journal: the Institut für Spielforschung und Spielpädagogik in Salzburg, the International Institute for Asian Studies in Leiden, the Russian Chess Museum in Moscow, the British Museum in London, and the Department of Computer Science at the University of Maastricht. The journal, which was published by CNWS Publications in Leiden on a yearly basis, was partially funded through the assistance of patrons and boasted a modern layout, trilingual summaries and color plates. The broad ambition of this journal required a continuous commitment from the editors, who reviewed contributions in German, French and English, provided translations of summaries for each article and, in several cases, collaborated extensively with authors to develop manuscripts that were to the academic standards of the publication. The journal had a trial run of three years, after which the format, content and review process was evaluated. The authors of the articles integrated wide-ranging literature necessary for a comprehensive understanding of particular games. Contributions from different disciplines — including psychology, computer science, philology, classical archaeology and history — allowed for a better historical and systematic understanding of board games to emerge. Starting in 2000, a section with a translation of primary sources was added. Book reviews and research notes further complemented the multi-facetted contents. Its first ambition, to serve as a platform for the publication of board games research, was met quickly, while gradually the journal gained prominence among researchers by publishing seminal historical overviews. The colloquia continued from 1995 onwards, moving from a biennial to a yearly schedule. The host institution was expanded beyond Leiden to universities and museums throughout Europe as well as Jerusalem, Philadelphia and, in 2013, the Azores. The colloquia continue to gather an enthusiastic group of scholars, players and collectors. Despite the institutional affiliations and a group of patrons, the production of the journal became financially and logistically problematic with CNWS no longer able to serve as a publisher. Reluctantly, the paper version of the journal was discontinued after volume 7 was published in 2004. The possibility of an online version of the journal had been explored with the online publication of the first issues, a decision that greatly assisted the dissemination of knowledge accumulated in those early volumes. The next step, an online journal that operates again as a platform for recent board games research, was not far away but required the skills and enthusiasm of previous and new editors to materialize. In these last fifteen years, the study of board games has gained momentum and this journal will not only showcase new results but, most of all, will encourage and publicize the work of the dedicated researchers in this field.

Alex de Voogt

To the authors

Board Game Studies is an academic journal for historical and systematic research on board games. Its object is to provide a forum for board games research from all academic disciplines in order to further our understanding of the development and distribution of board games within an interdisciplinary academic context. Articles are accepted in English, French, and German and will be refereed by at least two editors under the final responsibility of the Editorial Board. Please send your contributions in any editable format (Word, LaTeX, rtf, . . .) with a matching PDF file. Please send all the illustrations in separate files.

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