Models of war 1770–1830: the birth of wargames and the trade-off between realism and simplicity

Paul Schuurman

Models of war 1770–1830: the birth of wargames and the trade-off between realism and simplicity

Paul Schuurman

Faculty of Philosophy, Erasmus University Rotterdam, Rotterdam, Netherlands

ABSTRACT

The first sophisticated wargames (military board games) were developed between 1770 and 1830 and are models of military conflict. Designers of these early games experimented fruitfully with different concepts that were formulated in interaction with the *external* dynamics of the military systems that they tried to represent and the *internal* dynamics of the design process itself. The designers of early wargames were confronted with a problem that affects all models: the trade-off between realism and *simplicity*, which in the case of wargames amounts to the trade-off between realism and *playability*. I try to show how different game concepts were developed as an answer to this problem, and how these seemingly arcane concepts form a relevant topic of investigation in the history of ideas. Moreover, a direct offshoot of this conceptual experimentation between 1770 and 1830 was the 'free' German wargame (*Kriegsspiel*), which became an integral part of German operational planning in the nineteenth and twentieth centuries, thus adding another chapter to the story of the influence of ideas on human history.

1. Introduction

In the beginning of the history of military board games or 'wargames', there was chess. However abstract its character, chess was originally a battle-game and had always been associated with warfare.[1] Hence it is not surprising that wargame designers first turned to chess. In the Early Modern period, we see the development of games that maintained to all intents and purposes the mechanics of chess, while merely adding a few specifically military pieces to a slightly enlarged game board. These military chess variants would continue to appear between 1770 and 1830; but this period, so revolutionary in so many other regards, would also see the first *realistic* wargames – realistic in the sense that they tried to offer a model of a real military conflict. In this age of revolution, a whole range of completely new game concepts was introduced that have remained at the core of subsequent military board games and video games. In the most sophisticated early games, the abstract chess board was substituted by a huge game board that contained detailed three-dimensional topographic features on which infantry fought melee battles, cavalry charged, and artillery delivered volleys. Units were supported by complex logistical systems, while players were kept in suspense by the fog of war and the friction of random events.

CONTACT Paul Schuurman ✉ schuurman@fwb.eur.nl ▣ Faculty of Philosophy, Erasmus University Rotterdam, Burg. Oudlaan 50, Rotterdam, 3062 PA, Rotterdam, Netherlands

[1]M.J.R. Murray, *A History of Board Games Other than Chess* (Oxford: Oxford University Press), 83.

In the present article, I discuss 12 wargames published between 1770 and 1830. For a brief survey of these games, including their full and abbreviated titles, see Table 1. As they experimented within and beyond the simple format of chess, designers created more or less refined wargames, consisting of rules, units and a game board, that represented a real-world system consisting of warfare.[2] These wargames were what we now call 'models'. Since models are less complicated than the system that they represent, they can be understood and manipulated more easily than the real system itself. If a wargame amounts to a model, then playing such a game amounts to a simulation. In this way, the term 'model' is used in a relatively passive sense and the term 'simulation' in a relatively active sense; models are *used* to *run* a simulation, not the other way round.[3] We will see how wargame designers between 1770 and 1830 used similar *concepts* if not quite the same *terminology*.

Models can be more or less realistic, and they can also be more or less simple. Ideally, models are both realistic and simple, but since realism is generally bought at the price of simplicity, a good model should give, in the words of the modern author Beat Schwendimann, 'a judicious trade-off between realism and simplicity'.[4] This trade-off problem is typical of models in general and it was also very relevant for the early wargames designed between 1770 and 1830. As they ventured beyond the simple format of chess, designers quickly realized that increased realism implies increased complexity, which inevitably brings decreased playability in its wake. For wargame designers, the general realism-*simplicity* problem for models tended to take the specific form of a realism-*playability* problem.[5] The balance between realism and simplicity (and hence playability) has influenced the evolution of wargames ever since, and the years between 1770 and 1830 provide us with the first solutions for this problem.

While chess has always been the subject of scholarly attention, wargames have had a more chequered career. Sometimes wargames were not taken seriously enough because of the association with amateur geeks; while some times they were taken too seriously, and hence classified by the military.[6] In this context, Philip Sabin woefully notes that 'traditionalist scholars in the humanities may see wargames as combining the worst features of game theory and counterfactual history'.[7] Although a full history of the wargames published between 1770 and 1830 still needs to be written, apologists of the genre have gained in strength.[8] There is now a growing appreciation of wargames as part of the

---

[2]Chess games: M.M. (1770) and Hoverbeck (1806). Wargames based on chess: Hellwig (1780), Allgaier (1796); [Armand Charles Daniel] Firmas-Périès, *Le jeu de stratégie ou les échecs militaires* (Memmingen: J. Rehm, 1807); Montbrison (1818) en Champblanc (1828). On the connection between wargames and chess, see Hellwig (1780), 4, 6–12; Montbrison (1818), vi, 27; and also Peter P. Perla, *The Art of Wargaming* (Annapolis, MD: U.S. Naval Institute, 1990), 15–16; Claus Pias, *Computer—Spiel—Welten* (München: Sequenzia, 2010), 204; Jesper Juul, *Half-Real. Video Games Between Real Rules and Fictional World* (Cambridge: The MIT Press, 2011), 10; Philip Sabin, *Simulating War. Studying Conflict Through Simulation Games*. 2nd ed. (London: Bloomsbury, 2014), 79.

[3]Beat Schwendimann, 'What Is the Difference Between a Simulation and a Model?', http://proto-knowledge.blogspot.nl/2010/12/what-is-difference-between-simulation.html (accessed 8 November 2016; see also Paul E. Johnson, 'Simulation Modeling in Political Science', *American Behavioral Scientist* 42 (1999): 1511; Pias, *Computer*, 206; Anders Engberg-Pedersen, *Empire of Chance. The Napoleonic Wars and the Disorder of Things* (Cambridge, MA: Harvard University Press, 2015), 36; Sabin, *Simulating War*, 4; Ivar Oswalt, 'Current Applications, Trends, and Organizations in U.S. Military Simulation and Gaming', *Simulation & Gaming*, 24 (1993): 156–7.

[4]Schwendimann, 'Difference'; see also Jason Roher and Jacob Aron, 'Better Living Through Gaming', *New Scientist* (10 March 2012): 26; Josef Köstlbauer, 'The Strange Attraction of Simulation: Realism, Authenticity, Virtuality', in *Playing with the Past. Digital Games and the Simulation of History*, ed. Andrew B.R. Elliott and Matthew Wilhelm Kapell (New York: Bloomsbury, 2013), 170; Sabin, *Simulating War*, 4–6.

[5]See Engberg-Pedersen, *Empire of Chance*, 121; Sabin, *Simulating War*, 19, 27–8.

[6]Sabin, *Simulating War*, 15.

[7]Ibid., 16.

[8]On wargames between 1770 and 1780, see Daniel Hohrath, 'Prolegomena zu einer Geschichte des Kriegsspiels', in *"Das Wichtigste ist der Mensch". Festschrift fur Klaus Gerteis zum 60. Geburtstage*, ed. Angela Giebmeyr and Helga Schnabel-Schüle (Hamburg: H.G. Schulz, 1967), 139–52; Perla, *Wargaming*, 15–34; Philipp von Hilgers, *Kriegsspiele. Eine Geschichte der Ausnahmezustände und Unberechenbarkeiten* (München: Wilhelm Fink & Ferdinand Schöningh, 2006), 43–71; Rolf F. Nohr and Serjoscha Wiemer, 'Strategie Spielen', in *Strategie Spielen*, ed. Rolf F. Nohr and Serjoscha Wiemer (Münster: Lit, 2008), 7–28; Rolf F. Nohr and Stefan Böhme, *Johann C.L. Hellwig und das Braunschweiger Kriegsspiel* (Braunschweig: Appelhans, 2009); Gunnar Sandkühler, 'Die philantropische Versinnlichung Hellwigs Kriegsspiel als pädagogisches und immersives Erziehungsmodell', in *Strategie Spielen*, ed. Rolf F. Nohr and Serjoscha Wiemer, 69–86; Martin van Creveld, *Wargames. From Gladiators to Gigabytes* (Cambridge: Cambridge University Press, 2013), 144–51; Engberg-Pedersen, *Empire of Chance*, 287 n. 92.

history of rational thinking; of their place in educational, moral and scientific discourses; and of their role as models for strategic action.[9]

The relevance of the realism-simplicity dilemma for wargames has been appreciated by modern authors, but to my knowledge, the present article is the first study devoted to the solutions for this problem between 1770 and 1830.[10] I will argue that the considerable variation between the 12 games discussed in this article can be understood, at least partly, in terms of different solutions for the realism-simplicity dilemma. Before I address this central point, I will pay attention to the typology and functionality of these games (Section 2) and the historical background (Section 3). After my discussion of the design solutions for the realism-simplicity dilemma in the central Section 4, I will discuss the influence of this dilemma on the presence or absence of chance in the form of dice in these games (Section 5) and the tenacity of Enlightened thought that may have acted as a brake on the use of random elements in wargames between 1770 and 1830 (Section 6). Sections 2, 3 and 6 provide the context for a consideration of the realism-simplicity problem in wargames between 1770 and 1830 as a topic in the history of ideas.

2. Wargames 1770–1830: types and functions

Eleven out of the 12 wargames from the period 1770–1830 discussed here were developed in the German-speaking parts of Europe, while number twelve is French (Montbrison (1818)). I have studied these games exclusively on the basis of the books that contain the game rules. The buyers of these books in most cases were supposed to produce the games themselves, or *have* them produced. Hence the books tended to contain detailed instructions for the construction of the games. Many games were specifically designed for a military audience, but often a general public was targeted as well.[11] The less complicated games tended to stress amusement for a bourgeois public, while the more sophisticated games tended to stress instruction for (young) officers.[12] Wargames developed between 1770 and 1830 can be divided into at least two morphological types, which can be called symmetrical and situational, and which are connected with (partly) different functions.

Firstly, *symmetrical wargames* used symmetrical maps on which both players placed exactly the same units in exactly the same position; an example is a chess-like game of M.M. (1770). The realism of these wargames was limited to the general mechanics of tactical or strategic military conflict, and did not refer to any specific conflict. Symmetrical wargames could be used for recreation or for exercising young officers in the elementary mechanics of the art of war.[13] The designers of these games stressed the privileged function of wargames over military textbooks, because they were able to *show* rather than to blindly *inculcate* rules. Wargames demanded active participation rather than passive absorption. In this sense, they belong to a well-entrenched Early Modern pedagogic tradition. This tradition required teachers to instruct in the simplest way possible by *showing* and students to learn by *doing*. These educational ideas had already been defended by Comenius and Locke in the seventeenth century, and counted Rousseau, Pestalozzi, and Johann Bernhard Basedow (1724–1790) among their more recent representatives, although the reception of these new ideas was far from uniform.[14] For instance, German Enlightened (military) thinkers tended to be more interested in education than their French counterparts. Frederick the Great stressed the idea that the military profession could be studied theoretically and hence that it required academic instruction. From the late 1770s onwards, countless regimental military schools throughout Germany appeared.

---

[9]Nohr and Wiemer, *Strategie Spielen*, 10.

[10]Sabin, *Simulating War*, 98–9.

[11]Military audience: Hellwig (1780), xix; Reiswitz (1812), 3; Perkuhn (1817), i (Vorrede); Aretin (1830), xxxi. Civilian audience: M.M. (1770), 8; Champblanc (1828), xiv; Montbrison (1818), i.

[12]Hellwig (1780), xix; Venturini (1804), 2; Hoverbeck (1806), 12; Opiz (1806), 5, 42; Reiswitz (1812), 3; Montbrison (1818), vi; see also Hohrat, 'Prolegomena', 141.

[13]Hellwig (1780), 155; Hoverbeck (1806), 70; Opiz (1806), 42; Reiswitz (1812), 3; Perkuhn (1817), 1; Aretin (1830), xi, xxxi.

[14]Sandkühler, 'Kriegsspiel als Erziehungsmodell', 69–73 and Engberg-Pedersen, *Empire of Chance*, 106–7.

The growth of these institutions stimulated the production of military literature; and this institutional context may explain the preponderance of German wargames.[15]

Secondly, *situational wargames* presented a strategic or tactical situation in a specific loco-temporal framework. A start in this direction was made by Hellwig (1780), who remained faithful to a symmetric game board and evenness in the type and number of units, but who allowed for the possibility of a flexible and hence non-symmetrical set-up; followed by Algaier (1796), who suggested that the game board itself of his small tactical wargame could be customized asymmetrically; and by Opiz (1806), who suggested the same for his large strategic game board.[16] When symmetry in the type and number of military units was also dropped, we reach the full dimensions of a situational wargame.

Situational wargames, like symmetrical wargames, could be played for recreational or instructive purposes, and these would indeed remain their dominant functions in the Napoleonic era. In the course of the nineteenth century, however, situational wargames would be used increasingly for the simulation of *future* conflicts, as a preparation for these conflicts themselves. In this way, situational wargames could be used in a more direct and practical way, unlike wargames used for general instruction. In the Napoleonic era, we see the development of wargames that had the *potential* to become practical (rather than merely instructive) wargames, although none of them actually fulfilled this potential. One important step in this practical direction was made by Reiswitz Sr (1812). He improved the recently introduced concept of a topographic game board, and he replaced rigid (fixed) game rules with more free (flexible) rules. In his game, each side consisted of a team of several officers who wrote out their orders in a separate room. These orders were then processed by an umpire (*Vertrauter*) in the central room, who moved the units on the game board in accordance with these instructions. Typically the umpire was a senior officer who was given the discretionary power to steer the game through situations that would have been too complicated for rigid rules.[17] The umpire developed the *General-Idee* of the battle and assigned specific units to the opponents in accordance with this idea. The umpire also decided which units started out of sight of the opponent, using a so-called *Truppenverberger*, and he decided when these units were revealed. In this way, Reiswitz Sr (and his son in 1824) provided a degree of realism and flexibility that would be further developed in the free (rather than rigid) German *Kriegsspiel*, and that allowed the detailed formulation and testing of tactical (and later also) strategic scenarios. The Prussians used wargames for the logistical planning of their wars against Austria (1866) and against France (1870/1871). Before the First World, the Schlieffen Plan was tested with the apparatus of the *Kriegsspiel* and the same holds true for the attack on Poland, Operation Barbarossa and the Ardennes Offensive.[18] In this way, wargames were not only used for long-term training purposes, but also for immediate and practical results.[19]

In addition to future conflicts, designers in the period 1770–1830 also started to experiment with wargames that could be used to simulate *historical* battles or campaigns, although this start was again rather tentative. While historical wargames are a well-represented genre in present-day board games and video games, the first historical battle that I have been able to find in the 12 game manuals is by Montbrison (1818): the Battle of Denain (1712). He depicts the real battle field and gives the unequal

---

[15]Azar Gat, *A History of Military Thought from the Enlightenment to the Cold War* (Oxford: Oxford University Press, 2001), 57–68.

[16]Allgaier (1796), 9; Hellwig (1780), 123, 137; Venturini (1798), 1–2; Opiz (1806), 25.

[17]Reiswitz Sr (1812), 2; Reiswitz Jr (1824), 26–7.

[18]Pias, *Computer*, 225–6, 244–5; see also John P. Young, *A Survey of Historical Development in War Games* (Bethseda: Operations Research Office, 1959), 17–85; Alfred H. Hausrath, *Venture Simulation in War, Business, and Politics* (New York: McGraw-Hill, 1971), 5–8; Hohrath, 'Prolegomena', 146–52; Perla, *Wargaming*, 30 ff; Van Creveld, *Wargames*, 151–6.

[19]Moreover, wargames were not only used for *prior* testing, but even *during* campaigns. See Van Creveld, *Wargames*, 162:

> As an episode of November 1944 shows, the Germans maintained their faith in the method to the end. By an extraordinary coincidence, the US Army attacked the front of the German Commander-in-Chief West, Field Marshall Walter Model, in the midst of a wargame designed to simulate just such an offensive. Instead of breaking off the game, Model made it go on. The relevant orders were fed straight to the front, thus saving precious time.

See also Pias, *Computer*, 245; Köstlbauer, 'Strange Attraction', 175–8.

battle order of the two armies, but he takes care to stress that 'A completely equal chance should be offered to the two parties, especially at the start of the game.'[20] Here we have the first attempt, as unconvincing as attempts in subsequent wargames, to create equal chances for victory in what is supposed to be a *historical* simulation. Actually Montbrison's game was much too simple to provide a realistic representation of a historical or future conflict, but at least Reiswitz Sr (1812) and Reiswitz Jr (1824) may have had this potential on the scale of separate battles, while the same could be said of Venturini (1798) and Aretin (1830) on the level of entire campaigns.[21]

3. Historical background: peace and war and peace

Although it makes sense to consider the period 1770–1830 as the period when wargames were conceived and brought to a respectable level of maturity, this period, consisting of the last years of the Ancien Regime, the French Revolution, Napoleon, and the Restoration, is of course the very opposite of monolithic. It seems reasonable to suppose that these very different times must have left different marks on the 12 board games that are under investigation here, although actually, it is not always so easy to assess the nature of this influence. Aretin (1830) assumes that the Napoleonic wars seriously hampered the production of wargames, but this is a doubtful assumption. Of the 12 games considered here, a respectable number of 5 games were published between 1789 and 1815.[22] Moreover, the onset of Prussia's clash with Napoleon in 1806 may have influenced the timing of the publication of the *National-Schach* of Hoverbeck (conceived in 1803, but published in 1806), which is replete with a belligerent nationalism.[23] Similarly, the coming of war in the same year may have stimulated the younger Opiz to finally publish a rather more sober wargame that his father had already developed in 1760.[24] Finally, Reiswitz Sr (1812) writes that he lost his job in the Prussian army as a direct consequence of Prussia's catastrophic defeat in 1806, but also informs us that this gave him time to develop his wargame. When he demonstrated the game to King Frederick William III, of whom Napoleon had remarked that he could talk about little else but 'military headgear, buttons, and leather knapsacks', he received the enthusiastic support of the King and his two sons, the future King Frederick William IV and the future Emperor William I.[25] The subsequent state-funded support for Reiswitz Sr (and also for Reiswitz Jr) was more than the sign of a Prussian king's love of baubles. The game was sponsored as part of a reform movement that tried to infuse military and civilian institutions with a new vigorous spirit. Reiswitz's wargame was seen as a valuable element in the programme of a state that should 'educate its way out of the danger' – and although this Prussian response was caused by the defeat of 1806, we will see that it had firm roots in an existing Early Modern educational tradition (see Section 2).[26]

While the manuals for the wargames published in the extremely belligerent period between 1792 and 1815 stressed their military use, two wargames that clearly focus on civilian amusement were published outside this period: one by an anonymous author M.M. (1770) and one by the only French author, Montbrison (1818). The latter's game, published three years after the collapse of the French Empire, is presented as the French translation of a 'lost' and subsequently 'rediscovered' additional chapter of Laurence Sterne's *Tristram Shandy*, in which Tristram's father Walter presents a wargame supposedly invented by Walter's brother Toby. The collapse of the First Empire has made the French author (who had studied with Napoleon at the Military Academy in Paris) ironic about the activity of warfare and he suggests, not unreasonably, that the time has come to play and be entertained rather than to wage war.[27]

[20]Montbrison (1818), 163 (translations are by me, P.S., unless indicated otherwise).
[21]Aretin (1830), xix.
[22]Aretin (1830), xxii.
[23]Hoverbeck (1806), see the unpaginated dedicatory letter.
[24]Opiz (1806), 42.
[25]Van Creveld, *Wargames*, 147.
[26]Engberg-Pedersen, *Empire of Chance*, 114.
[27]Montbrison (1818), 1.

In addition to the influence of this obvious pattern of an incessant warfare between 1792 and 1815, preceded and followed by more peaceful times, there is the more specific question of the influence of the French Revolution and the Napoleonic 'military revolution' on contemporary wargames.[28] Napoleon's preference for swift campaigns crowned with decisive battles that knocked out entire nations in a single blow has often been contrasted with military operations during the Ancient Regime that proceeded at a more leisurely pace and were mounted to capture (a series of) towns and strongholds. The importance attached to the conquest of individual towns (with a bonus for *not* burning them down) in the game of Allgaier (1796) seems indicative of the old style of warfare.[29] When on the other hand Reiswitz Sr (1812) presents the option of a so-called *Schlagepartie* which can only end with a decisive battle, we definitively seem to have entered the Napoleonic era.[30] Moreover, military innovation was made possible by developments in cartography, and in wargames the increased role of military maps was reflected by a transformation from the abstract chessboard to the topographic gameboard. On the whole, however, the specific impact of the momentous military changes in the period 1770–1830 on wargames is surprisingly light. This is probably because the nature of these changes was not only dramatic but at the same time relatively subtle. For instance, the cumbersome depot system of eighteenth-century warfare has often been contrasted with the improvised French practice of 'living off the countryside' during the wars of the Revolution. If this simply implied the difference between the presence and the absence of a depot system, then it would be relatively easy to model in wargames; but actually, the difference was more complicated, especially if we contrast the Ancien Regime not with the French Revolution, but rather with the logistical system perfected by Napoleon. Although the Emperor maintained the light baggage trains of the Revolution and his armies continued to live off the countryside during the deconcentrated phases of his campaigns, he actually augmented and organized a depot system that allowed him to support the French projection of power deep into Central Europe with a constant flow of new ammunition and fresh recruits. While the old depot system had dictated the decisions of generals, Napoleonic 'logistical voluntarism' bent logistics to a much larger degree to the will of the commander.[31] The resulting shift in military reality was dramatic, but may have been difficult to depict in wargames. Yet although many Napoleonic innovations were not specifically incorporated in the newer wargames of our period, games at the campaign level at least allowed players to emulate such concepts as Napoleon's deconcentrated advance followed by concentration for the decisive engagement during a campaign; while games at the tactical level allowed Napoleonic enveloping attacks during individual battles.

4. Trade-off between realism and simplicity

Whatever their precise ambitions and whatever their success, it can be said that all wargame designers between 1770 and 1830 tried to create realistic models. Realism was not only claimed for complex situational games but even for simple symmetrical games.[32] The claim to realism inevitably brought the realism-simplicity problem in its wake (see Section 1). A clear and explicit formulation of this problem was indeed provided by Aretin (1830), who tried to develop a game 'that steers a middle course between too many rules and calculations, and too much simplicity, which would make it unlike [real] war'.[33] There was no single answer to the realism-simplicity problem and because the problem was acutely shared by most of the designers discussed here, they tended to

---

[28]See especially Stéphane Béraud, *Le révolution militaire napoléonienne. Vol. I Les manoeuvres* (s.l.: B. Giovangeli, 2013).

[29]Algaier (1796), 49–51; see also Hellwig (1780), 8, 122.

[30]Reiswitz Sr (1812), 1.

[31]Béraud, *La révolution militaire*, 63–100. See also Carl von Clausewitz, *Vom Kriege*, ed. Werner Hahlweg (Bonn: F. Dümmler, 1972), 588.

[32]Hellwig (1780), 1; Allgaier (1796) [3]; Opiz (1806), 21; Reiswitz Sr (1812), 3; Perkuhn (1817), i; Montbrison (1818), 69, 160; Reiswitz Jr (1824), ix, 15; Aretin (1830), xiii.

[33]Aretin (1830), xxix; see also Hellwig (1780), xv; Opiz (1806), 5–6; Chamblanc (1828), iii; and Hohrath, 'Prolegomena', 147.

compare their own solutions with those of their predecessors. Many manuals started with a historic overview of previous wargames. And while Early Modern polemics in general did not shy away from a rhetoric that could be exceedingly vehement by present standards, the designers of wargames tended to see their balancing act between realism and simplicity in terms of dispassionate conceptual engineering.[34]

Increased complexity in wargames, and hence decreased playability, was caused by an increase in realistic features. The realism-simplicity *problem* already showed up between 1770 and 1800 in the games of Hellwig (1780) and Venturini (1798), but the clearest *solutions* for this problem were articulated between 1800 and 1830. So, how did wargame designers try to maintain realism while at the same time also maintaining simplicity, and hence playability for their players?

Firstly, and most obviously, designers realized that it was very important not to include unnecessary features. This implies what can be called an economic approach. Economy is stressed in particular by Montbrison (1818). The number of units should not be larger than *les besoins du service*.[35] When he adds rules for siege warfare, he defends this inclusion of additional detail with its indispensability.[36] More in general he ascribes various forms of economy to 'Captain Tobie Shandy': 'Such were the true conditions of the problem. *Minimum* of time; *minimum* of space; *minimum* of units; *minimum* of difficulties. What a lot of *minimum*!'[37] In this context, Montbrison explicitly evokes Ockham's Razor, whose law of parsimony states that entities must not be multiplied beyond necessity.[38] Montbrison's favourite way of applying Ockham's Razor is the use of analogy. When he describes the ways in which pawns and sappers can take a pontoon, he feels that he does not need to introduce new rules, because earlier on he has already used the same rules for the capture of unmanned batteries.[39] Similarly, he notes the analogy between the functions of sapper, skirmisher and light infantry, which accordingly are fulfilled by the same kind of generic unit.[40]

Once it is deemed important to bring similar cases under a single denominator, it becomes attractive to use general and abstract principles that rule multiple individual cases. Hence, many designers searched for the main principles of warfare, briefly articulated these principles, and tried to include them in their wargames. Hellwig enunciated several general principles of warfare in 1780 (which he repeated more extensively in 1803).[41] Since he assumed that he had achieved a close fit between the principles that govern his game and those that govern war in reality, he believed that it would be difficult to provide players with tips about his game without boring them with tips about the art of war itself.[42]

How convincing was this approach? If a quest for economy involving the use of analogies and general principles led to a more abstract form of realism in wargames, then the question is whether this approach was not in danger of collapsing back to the abstract zero-base level of chess from which many designers had departed in the first place. Indeed, the most articulate proponent of the economic solution to the realism-simplicity problem, Montbrison, considers chess itself a true image of war.[43] And he considers his own game merely a more militarized form of chess.[44] It should be noted, however, that economy was not only propounded by designers of simple chess like recreational wargames. Economy also figures in more elaborate games designed for a military audience. For example, Hellwig (1780) stresses at various instances the use of multifunctional units; and Perkuhn (1817)

---

[34]Allgaier (1796), [v–vi]; Opiz (1806), 5; Reiswitz Sr (1812), xxviii; Montbrison (1818), 237–241 n.; Champblanc (1828), iii-iv; Aretin (1830), xiii–xxix.
[35]Montbrison (1818), 81–2.
[36]Montbrison (1818), 133 n. 1, 202 n. 1.
[37]Montbrison (1818), 37.
[38]Montbrison (1818), 33, 38.
[39]Montbrison (1818), 111.
[40]Montbrison (1818), 58, 68.
[41]Hellwich (1803), v.
[42]Hellwich (1780), 144; Montbrison (1818), 26.
[43]Montbrison (1818), 27.
[44]Montbrison (1818), ii.

underlines the importance of analogous rules.[45] The constant dynamic tension between realism and simplicity has guaranteed the continued relevance of economy for designers of models in general, including models in the form of both simple and sophisticated wargames.

A second approach to the realism-simplicity problem was more appropriate for wargames in particular: a change of scale from the strategic to the tactical level. Reiswitz Sr (1812) notes that where Hellwig (1780), Venturini (1798), and Opiz (1806) had tried to enable simulations of entire campaigns, his own more limited aim is to facilitate simulations on the tactical level of separate battles.[46] He explains that his predecessors were carried away by the idea of warfare on the grand scale of entire provinces or even countries, which put players in the illustrious role of supreme commander of an entire theatre of operations. The requirement of realism on the level of an entire campaign forced designers to create mechanisms for logistics, recruitment of new units, and even peace treaties. These features increased complexity and decreased playability. Moreover, the large scale of these games meant that there was a poor match between the abstract playing units and the actual infantry, cavalry and artillery they were supposed to model. The large time frame of strategic games had similar disadvantages.[47] Hence, according to father and son Reiswitz, *strategic* wargames combined the worst of two worlds: poor playability and limited realism. They both believed that *tactical* realism could be obtained at the cost of less complexity than *strategic* realism. They may have had a point to the extent that their solution had a particularly simplifying effect on logistical game aspects, which were a notorious source of complexity. Logistical aspects are more important on the strategic level that models an entire military campaign than the tactical level that models a single battle. Hence it is not surprising that the four strategic games considered here, those by Hellwig (1780), Venturini (1798), Opiz (1806) and Aretin (1830), have sophisticated rules for logistics, while none of the remaining games, which all model a tactical rather than a strategic level, have no logistic mechanism.

Typically, the Reiswitz switch from the strategic to the tactical level did not remain unchallenged. When Aretin (1830) defended his strategic wargame, he remarked that the Reiswitz solution resulted in a tactical game that was actually too complicated and tedious, while its limited scale meant that it missed the very essence of warfare, which for Aretin consists in (strategic) operations on a Napoleonic scale rather than (tactical) battles – hence the very title of his game: *Strategonon*.[48] Indeed, as a solution to the realism-simplicity problem, zooming in from a higher to a lower level seems of limited value. Zooming in can free the designer of some *higher level* complexities, but if he wants to maintain a similar level of realism, we would expect him to include additional *lower level* features – and if each level has its own complexities, then the result of zooming in from a higher to a lower level will not necessarily result in an overall reduction of complexity. However, father and son Reiswitz simply did not include as many new lower level complexities as they shed higher lever complexities; and in this way they could indeed end up with less complexity and greater playability.

A third and more convincing strategy to solve the realism-simplicity dilemma was again developed by father and son Reiswitz. I already remarked on the great flexibility of their sophisticated games, thanks to the role of the umpire, who was able to solve many problems by *ad hoc* decisions, so that no detailed game rules were required (see Section 2). Consequently, compared to games with a similar level of sophistication, the rules of the Reiswitz games are remarkably short and sketchy – not because complexity was reduced, but because it was transferred from the players to the umpire.[49] While the rulebook of his game remained slender, Reiswitz Jr demanded from its players real military knowledge 'of the use of different arms when these are put to a single purpose in an interconnected

[45]Hellwig (1780), xi, 104 (see also Engberg-Pedersen, *Empire of Chance*, 120); Perkuhn (1817), 29, 31.
[46]Reiswitz Sr (1812), xiv.
[47]Reiswitz Sr (1812), xxiii and Reiswitz Jr (1824), viii.
[48]Aretin (1830), xxvi; see also Hohrath, 'Prolegomena', 148.
[49]See also Reiswitz Jr (1824), ix. I have not been able to consult the tables that were mentioned in Reiswitz Jr (1824) in the 'Buch-Binder Nachrichten'; see also [Anonymous] 'Supplement zu den bisherigen Kriegsspiel-Regeln', *Zeitschrift für Kunst, Wissenschaft und Geschichte des Krieges* 13 (1828): 4, 68–105; Pias, *Computer*, 220–4.

way'.[50] This military knowledge was to guide their actions in the game and should help them to avoid silly and unlikely moves. Reiswitz Jr remarks that such forms of bad play could have been limited by proliferating the rules, but this would have removed the game from the main issues (*von den Haupt-sachen*).[51] This is where the umpire stepped in. Father and son Reiswitz did not need complicated rules to prevent unrealistic moves; such moves could simply be ruled out by the umpire. The succinctness of the rules was compensated for by the substantial discretionary and improvisational powers of the umpire. The umpire acted as a 'rule sink'. In this way, an original contribution was made towards the solution of the realism-simplicity dilemma. *For the players*, the umpire very effectively decreased the level of detail and hence the level of complexity.[52] At the same time, the umpire actively maintained a level of realism, including an explicit ban on unrealistic moves.[53]

5. The realism-simplicity trade-off and chance

Warfare is complicated by the fact that it consists of elements that are difficult or even impossible to control and for which Carl von Clausewitz (1780–1831) used the term 'friction'; this word applies to all the elements that make the difference between campaigns as planned on paper and the way they unfold in reality.[54] Friction tends to consist of uncertainties, and some designers saw the simulation of uncertainty as an important contribution towards the realism of their games, even if this resulted in a more voluminous rule book. In this sense, uncertainty is very relevant for the realism-simplicity problem. An important way to simulate uncertainty was the use of dice. Dice as generators of random events in wargames were first introduced by Opiz (1806). He observed that warfare cannot be imitated without the inclusion of chance, hence his introduction of 'The Yes and No of the dice'.[55] He used this feature right away for a variety of different concepts. For instance, dice were used to determine the position of the game board (optional) and the chances of success when players tried to move units into rough terrain.[56] For units that were out of supply, a die was first rolled to check if they would desert and, if this was indeed the case, a second roll determined the level of losses by desertion.[57] A similar but more sophisticated accumulation of randomization was used to determine battle results. Opiz used a combat results table that anticipates the complex military board games of the 1980s.[58] Randomization with dice was also used by Reiswitz Jr (1824), but was largely limited to the assessment of battle results, for which he used a combat results table as well.[59]

Intriguingly, the use of dice in wargames in 1770–1830 was never generally accepted, and remained the topic of a lively discussion in the relevant literature. This discussion about chance actually started already before the publication of Opiz's innovation in 1806. In 1803 an anonymous

---

[50]Reiswitz Jr (1824), 37.

[51]Reiswitz Jr (1824), 37.

[52]Reiswitz Jr (1824), 4; see also Pias, *Computer*, 208 n. 48 and Sabin, *Simulating War* 31.

[53]The complexity absorbing role of Reiswitz's umpire in many ways anticipated a similar feature of (military) video game. In this context, Philip Sabin rightly remarks that computer games seem to minimise the trade-off between (detailed) realism and playability (Sabin, *Simulating War*, 19). And when James F. Dunnigan presents a list of differences between computer wargames and their paper predecessors, he mentions easier rules as a distinctive characteristic of computer (war)games, because the rules of computer games have been embedded in the programme itself. In addition, Dunnigan stresses the ability of computer games to free the hands of the players by acting as a super clerk (James F. Dunnigan, *Wargames Handbook, Third Edition* (San Jose: Writers Club Press, 2000), 73). In the Reiswitz games, rules were embedded in the umpire, who also acted as a super clerk; see Pias, *Computer*, 208 n. 48; Köstlbauer, 'Strange Attraction', 176; and also Perla, *Art of Wargaming*, 42.

[54]Clausewitz, *Vom Kriege*, 261–4; Clausewitz, *Die wichtigsten Grundsätze des Kriegführens zur Ergänzung meines Unterrichts bei Sr. königlichen Hoheit dem Kronprinzen*, in *Vom Kriege*, 1047–86; Gat, *Military Thought*, 187 n. 52; and Paul Schuurman, 'War as a System: A Three-Stage Model for the Development of Clausewitz's Thinking on Military Conflict and Its Constraints', *Journal of Strategic Studies* 37 (2014) 929–931.

[55]Opiz (1806), 6.

[56]Opiz (1806), 46–7, 61–2; see also Engberg-Pedersen, *Empire of Chance*, 128–33.

[57]Opiz (1806), 79.

[58]Opiz (1806), 74–6, 15–16; see also Reiswitz Jr (1824), 34, 52.

[59]Reiswitz Jr (1824), 34, 52; I have not been able to consult Reiswitz's additional tables, mentioned in Reiswitz Jr (1824) 'Buch-Bin-der-Nachrichten'; see Pias, *Computer,* 222–4.

author, 'Kr.', published a review of the wargame by Venturini (1798) in which he regrets the absence of chance which is such a vital element of war.[60] Venturini stresses indeed that a good wargame only depends on the will of its players, and is not determined by random factors; there should be no place for differences caused by 'the bravery of the troops, or betrayal, or the random favour of the weather'.[61] Similarly, when Hellwig in the 1803 reprint of his game discusses the dual aim of his wargame – instruction and recreation – he expresses an aversion to forms of chance that are not caused by the moves of the players themselves.[62] Finally, when Aretin (1830) discusses Opiz's introduction of chance, he regrets that in this game even the smartest game manoeuvres can be utterly ruined by the mere throw of the die.[63] Aretin was quite able, however, to separate his wish to reduce gamer frustration from harsh reality itself. He fully acknowledges the importance of chance in the reality of warfare, which he supports with a Napoleonic quotation about the ability to profit from chance as a defining trait of the good commander. Yet when he explicitly tries to maintain an equilibrium between realism and simplicity he argues that this middle course should exclude simplicity in the form of chess like moves, but also complexities in the form of, amongst other things, the use of dice.[64] Here again, as in so many other cases, the balance between realism and simplicity in wargames between 1770 and 1830 was dynamic, unstable, and the object of constant polemics and experimentation, as indeed it has remained down to the present day. Given this context, it is not surprising that between 1770 and 1830 the fate of chance itself remained highly erratic.

Moreover, in addition to dice, there were other ways to simulate uncertainty. One kind of military uncertainty concerns the whereabouts of the enemy. This 'fog of war' could be simulated during set-up of the game with a screen, or by a device that covered units when play had started. Set-up screens were introduced by Allgaier (1796); we have seen (Section 2) that Reiswitz Sr (1812) introduced a *Truppenverberger*; while Perkuhn (1817) used a similar mechanism.[65] Actually, playing wargames has inherent uncertainties, even without any deliberate attempt at simulation by the designers. These uncertainties are produced by interaction between the various mechanisms of the game and between the players themselves. Perkuhn (1817) notes that each type of unit in his game is unique in either its movement, or in its combat strength (*Übermacht*), or in both combined, while the interactions between these elements produce uncertainties that are reinforced by different types of terrain.[66] M.M. (1770) similarly notes the uncertainty produced by the mere *caprice des joueurs*.[67] Hoverbeck (1806) asserts that his chess like and dice-less game will stimulate young officers to think about the intentions of their opponents. He assumes that this way of thinking about '*possibility – and probability*' will foster '*composure or presence of mind*' (italics by the author).[68] Aretin (1830) also mentions the important lessons of cool-headedness that can be learnt from his dice-less game, especially after an *unexpected* loss.[69]

These cases of dice-less uncertainty in wargames may be typical of what Jesper Juul, a modern author on video games, calls games of emergence. While game guides for *games of progression* concentrate on the order of actions in what typically constitutes a story line, game guides for *games of emergence* will concentrate on rules of thumb that help the player choose between options that will rapidly amount to a large game tree. Games of emergence, for instance, chess and other conflict games, are characterized by a relatively small number of rules that yield a relatively large number of options that can only be dealt with by designing strategies, resulting in the paradox 'easy to

---

[60]Kr., review of Venturini (1798) in *Neue allgemeine Bibliothek. Anhang zum neun und zwanzigsten bis acht und sechzigsten Bande, enthaltend die noch übrigen Anzeigen von Büchern v. 1796–1800. Zweite Abtheilung* (Berlin: F. Nicolai, 1803), 550.
[61]Venturini (1798), 1.
[62]Hellwig (1803), iii.
[63]Aretin (1830), xxi.
[64]Aretin (1830), xxix, 134; see also Hellwig (1803), v.
[65]Allgaier (1796), 52–3; Reiswitz Sr (1812), 32; Perkuhn (1817), 37–8; see also Sabin, *Simulating War*, 106–15.
[66]Perkuhn (1817), iii (Vorrede); see also Aretin (1830), 61–2.
[67]M.M. (1770), 58.
[68]Hoverbeck (1806), 154.
[69]Aretin (1830), xxxii, 61–2.

learn but difficult to master'.[70] And indeed Philip Sabin observes that the mere presence of dynamic interaction between players in otherwise simple wargames generates infinite amounts of uncertainty, even without the use of any dice.[71] And if 'difficult to learn' is already a characteristic of simple strategy games, then this certainly holds true for more complex strategy games. This modern discussion may help us to understand why so many Napoleonic designers of 'games of emergence' were able to see uncertainty and surprise in games that did not use mechanisms for the explicit generation of these phenomena. This may explain why Opiz's creative introduction of dice in his wargame was not universally imitated, and why the polemics about the simulation of uncertainty in general and chance in particular continued.

6. Discussion: empire of chance?

The first wargames considered in this article were developed during the 'High' Enlightenment while the last were produced during the high days of German Romanticism and Idealism. The Enlightenment seems to have left a clear mark on the work of even the last of the twelve game designers discussed in this article. Military Enlightenment thought included a belief in the desirability and possibility of the formulation of fixed and universal principles of warfare. There was also a widely shared belief in the predominantly mechanical character of these principles: warfare tended to be formulated in physical terms of space, movement, and force. Immaterial factors such as the genius of the commander and the importance of chance were appreciated as well, but were not deemed susceptible to scientific treatment.[72] These views did not end with the wars of the French Revolution and Napoleon; on the contrary, they received their most eloquent expression by Antoine de Jomini (1779–1869). He served Napoleon as a general until he defected to the Russians in 1813, but continued to regard the Emperor's campaigns as the very epitome of the universal principles of war for the rest of his long life.[73] Jomini's main principles can easily be expressed in mechanical terms and revolve around the art of organizing, moving, and concentrating military units as swiftly as possible.[74] Thus, it can be said that Enlightened military thought survived well into the nineteenth century. Moreover, this way of thinking fitted hand-in-glove with a design strategy that reduced complexity by focusing on features that expressed essential principles rather than trivial details (see Section 4), especially if these principles were of a predominantly mechanical nature. Even the last designer in our period, Aretin (1830), was a firm believer in the existence of universal and fixed military principles.[75] When he argues for this point he explicitly quotes Jomini and other Enlightened sources.[76]

The influence of *post*-Enlightened thought on wargames published between 1770 and 1830 is more difficult to assess, if only because the most trenchant criticism of Enlightened military thought, Clausewitz's unfinished *Vom Kriege*, was not published (posthumously) until 1832.[77] For a recent and fascinating study on the intellectual paradigm shift between Enlightened and Romantic military thinking, we can turn to *Empire of Chance. The Napoleonic Wars and the Disorder of Things* (2015) by Engberg-Pedersen. The author of this study starts with a well-known depiction of eighteenth-century military theory guided by geometry and mathematical calculations for the construction of star-shaped fortifications and the drilling of troops. He then observes how around 1800 the vast expansion of military operations amounted to what the Prussian officer Georg Heinrich von Berenhorst (1733–1814) called an *empire du hasard*, a hazardous empire of chance, replete with errors and

---

[70]Juul, *Half-Real*, 57, 71, 73.
[71]Sabin, *Simulating War*, 55–7, 110–11, 118.
[72]Gat, *Military Thought*, 130.
[73]Gat, *Military Thought*, 73, 84, 115, 121.
[74]Cf. Engberg-Pedersen, *Empire of Chance*, 160.
[75]Aretin (1830), 133.
[76]Aretin (1830), 31.
[77]See Peter Paret, *The Cognitive Challenge of War: Prussia 1806* (Princeton, NJ: Princeton University Press, 2009), 121; Gat, *Military Thought*, 125–7.

uncertainties.[78] Engberg-Pedersen analyses the intricate but dramatic interactions between military events and the intellectual climate. He notes that 'Epistemology suffered a concussion at Austerlitz, at Wagram, at Borodino, and the effects of the impact can be measured in the texts that subsequently tried to make sense of the situation.'[79] He also notes that the epistemological 'concussion' caused by the new way of war made experience more artificial, in the sense that 'second-order' phenomena such as maps, games, and texts, were increasingly used as instruments 'to replicate the contingencies of war while excluding its dangers'.[80] In this context, the author pays due attention to the introduction of 'the Yes and No of the dice' by Opiz (1806).[81]

The degree to which the wargames studied here were actually affected by the contingent dimensions of Engberg-Pedersen's epistemological 'concussion', however, remained curiously restricted. We have already noted that Opiz's son may have responded to the needs of a changed intellectual climate when he finally published the 'random wargame' developed by his father in 1760 (see Section 3). But when Opiz Sr introduced chance in 1760 and played his game with eight young fellow Jesuits in Klattau (Bohemia), cuddled up in a room which they called their *Museum*, it is difficult to imagine him at the epicentre of an intellectual concussion.[82] On the other hand, we have seen that the dramatic year 1806 also saw the publication of a game by Hoverbeck (see again Section 3). It is easy to associate its nationalism with the dramatic events of the times; nevertheless, Hoverbeck's pseudo-chess game does not have the faintest trace of a concussion-induced random mechanism.

The difference between the game developed by Reiswitz Sr in 1812 and the version developed by Reiswitz Jr in 1824 is instructive in a similar way. Dice were only introduced by the younger Reiswitz, nine years after the Napoleonic wars. It is possible of course that the concept was already developed by his father, but in the introduction to his 1812 game Reiswitz Sr duly and perceptively acknowledges the novel random trait in Opiz's game, without showing any readiness to include dice in his own game.[83] So contrary to what might be expected, none of the games considered here provides a clear link between the introduction of dice and the turbulent military and intellectual climate of the Napoleonic wars. The realism-simplicity problem stimulated a preoccupation with clear principles. This preoccupation prolonged Enlightened thought in wargames well past its expiration date in other sectors.[84]

7. Conclusion

Designers of wargames between 1770 and 1830 had a clear model claim, i.e. in most cases, they tried to develop a game that represented a real military system. They preferred models that were not only realistic, but also simple, since simplicity was a major condition for playability. In this way, they quickly learned that good models demand a trade-off between realism and simplicity. They developed several solutions to this realism-simplicity problem, thus influencing the subsequent modelling of military conflict. The development of wargames, like the development of all models, was subject to both external and design-internal dynamics. By external dynamics, I mean the dynamics of the 'real' system that the model tries to represent. Design-internal dynamics, on the other hand, include the influence of the realism-simplicity problem in the design process. A dramatic and highly relevant kind of external dynamics was provided by the Napoleonic wars. I have concluded, however, that the *direct* influence of the Napoleonic military revolution on the design of wargames between

---

[78]Engberg-Pedersen, *Empire of Chance*, 3–4, 39.
[79]Ibid., 5.
[80]Ibid., 115.
[81]Ibid., 128.
[82]Opiz (1806), 41.
[83]Reiswitz Sr (1812), xxiii–xxiv.
[84]The tenacity of the Enlightenment did not prevent wargame designers from domesticating chance with the use of statistics – with or without dice. See especially Reiswitz Jr (1824), 8–10 and Aretin (1830), xxxi, 23, 38, 62, 100. See also Engberg-Pedersen, *Empire of Chance*, 4, on the growth of a 'middle realm of knowledge', and Philip Ball, *Critical Mass. How One Thing Leads to Another* (London: Arrow Books, 2005), 53–95.

1770 and 1830, although discernable, was relatively modest. Concentrating on the topic of chance, I have made a similar point about the modest *indirect* influence of the Napoleonic wars through the medium of the intellectual climate of the period on the design of wargames. Against this modest direct and indirect influence of external dynamics, I have noted a robust influence of design-internal dynamics in the form of the realism-simplicity problem. This relative predominance of design-internal aspects over external dynamics might cast some doubt on the wider historical relevance of the topic – but this was an age of fruitful experimentation, and one direct offshoot of this period of trial and error, the free *Kriegsspiel*, became an integral part of military operational planning in Germany (and other countries), thus ensuring a substantial historical relevance of the seemingly innocuous topic of wargames between 1770 and 1830.[85]

Acknowledgements

Disclosure statement

---

[85]For a list of primary titles, see Table 1.

Table 1. Wargames 1770–1830.

M.M., *Le Jeu de la guerre, ou raffinement du jeu des echecs/Neues Kriegsspiel, oder: verbessertes Schachspiel* (Prague: F.A. Hoechenberger, 1770) = **M.M. (1770)**	Elementary variation on chess. Aim of the game: amusement for a general audience. Designer unknown.
Johann Christian Ludwig Hellwig, *Versuch eines aufs Schachspiel gebaueten taktischen Spiels von zwey und mehreren Personen zu Spielen* (Leipzig: S.L. Crusius, 1780) = **Hellwig (1780)**; reprint: idem, *Das Kriegsspiel: ein Versuch die Wahrheit verschiedener Regeln der Kriegskunst in einem unterhaltenden Spiele anschaulich zu machen* (Braunschweig: K. Reichard, 1803) = **Hellwig (1803)**	Elaborate strategic game on a game board consisting of 1617 squares that express topographic characteristics; 8 types of units; non-combat assets include bridges and trenches; chess-like mechanism for movement (only one unit or group of unit moves per turn) and combat; sophisticated logistics in the advanced game version, with supply lines traced to depots. Aim of the game: instruction and amusement for a military target group. Hellwig (1743–1831) was a mathematician and entomologist who taught at the military academy of Braunschweig and the university of Helmstedt.
Johann Algaier, *Der Anweisung zum Schachspiel zweyter Theil* (Wien: F. J. Rötzel, 1796) = **Allgaier (1796)**	Variation on chess on an expanded game board of 600 topological squares. Aim of the game: amusement for a general audience. Algaier (1763–1823) was a German-Austrian chess master and theoretician.
Georg Venturini, *Beschreibung und Regeln eines neuen Krieges-Spiels* (Schleswig: J.G. Röhtz, 1798) = **Venturini (1798)**; reprint idem, *Darstellung eines neuen Kriegsspiels* (Leipzig: Johann Conrad Hinrichs, 1804) = **Venturini (1804)**	Elaborate tactical game on a game board with 2160–6912 topographic squares; wide array of different types of units; seasonal factors influence movement and combat; sophisticated logistics, with supply lines traced from capital plus corn harvested for additional supplies. Aim of the game: instruction for a military target group. Georg Venturini (1772–1802) was an officer in the army of the Duke of Braunschweig and a military writer.
C.E.B. von Hoverbeck, *Das preussische National-Schach* (Breslau: Stadt-Buchdruckerey, 1806) = **Hoverbeck (1806)**	Elementary chess-like game on 121 identical squares, with the standard pieces of chess plus batteries and fusiliers. Aim of the game: instruction for military target group. Hoverbeck was a Prussian cavalry captain.
Johann Ferdinand Opiz, *Das Opiz'sche Kriegsspiel, ein Beitrag zur Bildung künftiger und zur Unterhaltung selbst der erfahrensten Taktiker* (Halle: Hendels Verlag, 1806) = (**Opiz (1806)**	Elaborate strategic game with several modular game boards with 2304 topographic squares and 32 types of units; extensive use of dice randomizes aspects of unit movement, battle results and logistics. Aim of the game: instruction and amusement for a military and civilian target group. Johann Ferdinand Opiz (1741–1812) was an Austrian civil servant and writer; his game was published by his son, the painter Johann Ferdinand Opiz (1775–1841).
Georg Leopold von Reiswitz, *Taktisches Kriegsspiels oder Anleitung zu einer mechanischen Vorrichtung um taktische Manoeuvres sinnlich darzustellen* (Berlin: Gebrüdern Güdicke, 1812) = **Reiswitz Sr (1812)**	Sophisticated tactical game with a customizable topographic game board and countless military and support units; players produce written orders which are processed by an umpire; each move simulates a fixed amount of time (1 minute); movement measured with special compass; flexible victory conditions. Aim of the game: instruction for a military target group. Reiswitz Sr (1764–1828) was a Prussian officer and civil servant.
Johann Gottlieb Perkuhn, *Beschreibung eines Kriegsspiels zum Gebrauch für Militairs* (Hamburg: Appel, 1817) = **Perkuhn (1817)**	Compact but sophisticated tactical game on a customizable game board consisting of 1024 cubes, each of the six sides of each cube expressing a different topographic feature (plain, hill, mountain, forrest, water, town); 9 types of units; generals act as sources of communication; prisoners can be exchanged. Aim of the game: instruction and amusement for a military target group.
[Anonymous] [= Louis Simon Joseph Bernard de Montbrison], *Le Jeu de la guerre de terre et de mer, et les derniers chapitres de Tristram Shandy, trouvés dans les papiers d'Yorick* (Paris: Goujon, 1818) = **Montbrison (1818)**	Tactical chess-like game on a game board with 99 topographic squares; 16 types of units; non-combat assets include treasury and bridges; the game allows simple simulation of historical battles. Aim of the game: amusement for a general audience. Montbrison (1768–1841) first was a French officer, and in 1810 Napoleon appointed him Chancellor of the University of Strasburg.
[Georg Heinrich Rudolf Johann] von Reisswitz [*sic*], *Anleitung zur Darstellung militairischer Manöver mit dem Apparat des Kriegs-Spiels* (Berlin: [Trowitzsch], 1824) = **Reiswitz Jr (1824)**	Improved version of **Reiswitz Sr (1812)**; the scale of the squares of the game board is smaller; each move simulates 2 minutes; and battle results are influenced by dice. Aim of the game: instruction for a military target group. Reiswitz Jr (1794–1827), son of Reiswitz Sr, was a lieutenant in the Prussian army.
Franz Dominik Champblanc, *Das Kriegsspiel, oder das Schachspiel im Großen* (Wien: H.F. Müller, 1828) = **Champblanc (1828)**	Tactical chess-like game with customizable game board consisting of 460 topographic cubes; 11 types of units; each turn consists of 2 moves. Aim of the game: amusement for a general audience.
Wilhelm Freiherr von Aretin, *Strategonon, Versuch die Kriegsführung durch ein Spiel anschaulich darzustellen* (Ansbach: Dollfuss, 1830) = **Aretin (1830)**	Sophisticated strategic game with a customizable game board consisting of 144 topographic cubes; 8 types of units; generals act as sources of communication. Aim of the game: instruction and amusement for a military target group.