<center>Castalian Games</center>

## 0. Introduction

Precisely what it means for a work of fiction to be *speculative* remains a matter of some controversy in literary circles.[1] For some it is a genus containing fantasy and science fiction as species, for others it is a distinct genre to be contrasted with them, and for others still it is a tendency which cuts across these lines, a narrative form associated with but not always exemplified by the canon of science fiction and fantasy. I do not intend to settle the debate on these matters, but rather to present *The Glass Bead Game* – Herman Hesse's final, most acclaimed novel – as a *paradigm* of fiction's speculative potential.

Hesse's novel is many things. It is clearly *modernist* in its style, playing with the elements of a classical bildungsroman, framing them as a work of historical biography, and throwing them into contrast with the poetry and parallel 'lives' penned by the protagonist – Joseph Knecht – eventual *Magister Ludi* of the titular Game.[2] It is rigorously *hypothetical* in its setting, extracting a handful of tendencies from its present, projecting them into a minimalist future, and crafting from them an entirely new space – Castalia – preserve of high culture and the life of the mind. It is deeply *philosophical* in its scope, explicitly referencing the canon of modern European philosophy, implicitly encoding its themes in institutions and characters, and symbolically crystallising their tensions into a singular conceptual innovation – the Glass Bead Game – universal language and emblem of intellectual synthesis.

However, there are equally things it is not. Its stylistic modernism does not collapse into *formalism*, either in the critical sense of eschewing connections to its context or the technical sense of prioritising structure over substance. Its hypothetical setting belongs neither to science fiction nor to fantasy, scrupulously avoiding both *naturalistic reflections* and *fantastical narratives*. Its philosophical ambition does not translate into *didacticism*, refusing reduction to either historical prediction or allegorical moralism. The first point can be put to one side, insofar as any novel with speculative aims displays a function beyond its form, but the others say something about the character of these aims. The life of Knecht in Castalia is a peculiarly austere hypothesis. Its

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1   Robert A. Heinlein is usually given the credit for popularising the term (cf. 'On the Writing of Speculative Fiction'), but its usage has never quite settled, as amply demonstrated by the recent exchange between Margaret Atwood and Ursula K. Leguin (cf. Margaret Atwood, 'The Road to Ustopia' in *The Guardian* 14/10/2011).

2   I will use the capitalised 'Game' to distinguish the Glass Bead Game from other games throughout the rest of the essay.

carefully delimited deviations from the actual serve to evoke and embody ideas drawn from philosophy rather than science or mythology, but what the story extrapolates from them is less a singular thesis cloaked in narrative than an intricately crafted opportunity for further thought. The *hypothetical austerity* of Castalia forms the basis of the *speculative richness* of the Game.

My aim in the present paper is to unfold this richness. This means proceeding beyond interpretation of the text and toward elaboration of the conceptual designs it renders. This in turn requires a willingness to draw on conceptual innovations from outside the text in exploiting the speculative opportunities that the text itself supplies. I aim to do this by confronting the symbolism of the Glass Bead Game with philosophical developments in the theory of games. This being said, I do not intend to treat Hesse's work as a mere occasion for conceptual analysis, and for this reason it is important that any such analysis must emerge out of an interpretation of some of the novel's central themes.[3] The themes I have chosen are central preoccupations of the German philosophical tradition to which Hesse is responding: *history*, *freedom*, and *value*.

## 1. Castalia

The province of Castalia has its origins in Hesse's own time – a period beginning with the First but extending well beyond the Second World War, which future historians describe interchangeably as the Age of the Feuilleton and the Age of Wars. This period is best understood in terms of how it fits into the arc of European history as seen from the perspective of these historians:

> Since the end of the Middle Ages, intellectual life in Europe seems to have evolved along two major lines. The first of these was the liberation of thought and belief from the sway of all authority. In practice this meant the struggle of Reason, which at last felt it has come of age and won its independence, against the domination of the Roman Church. The second trend, on the other hand, was the covert but passionate search for a means to confer legitimacy on this freedom, for a new and sufficient authority arising out of Reason itself. We can probably generalise and say that Mind has by and large won this often strangely contradictory battle for two aims basically at odds with each other.[4]

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3  Of course, there are many more themes in the novel than I can adequately address. To mention a few: the parallels between Knecht's biography and his imagined 'lives', the allusions to Schopenhauer's philosophy that culminate in the sainthood of the Music Master, and the subtle manifestations of Chinese and Indian philosophy in Knecht's personal 'awakening'. For a more rounded reading of the book that discusses its genesis in detail see Theodore Ziolkowski, 'The Glass Bead Game: Beyond Castalia', in *Herman Hesse*, ed. Harold Bloom (Chelsea House, 2003).

4  Hesse, *The Glass Bead Game* (Picador Classics, 1987), hereafter *GBG*, p. 19.

If the enlightenment marks the ascendance of the first trend, then the Age of the Feuilleton is its apex, at which "men came to enjoy an incredible degree of intellectual freedom, more than they could stand."[5] This manifested in a wave of celebrity journalists and academics who drowned popular discourse in conflicting opinions and empty trivia, undermining the authority of academic expertise, and in the process creating the conditions under which it could be co-opted by political forces. This subversion of intellectual and cultural authority played an important role in facilitating the disastrous wars that ultimately defined the era.[6] By contrast, the establishment of the pedagogical provinces marks the ascendance of the second trend, through which the excessive intellectual freedom of the Feuilletons was bound by new secular and apolitical institutions, constituting new forms of academic authority equally unbound by the interests and struggles of the world beyond their borders.

Castalia is the archetype of this new system, a state within a state administered by the Order – a monastic hierarchy of scholars and teachers sworn to poverty and celibacy – and given two important roles within the whole. On the one hand, it is responsible for managing the educational system of the nation, providing teachers for the vocationally oriented schools and universities outside its borders, and selecting promising pupils from around the country to attend the academically focused 'elite schools' within them, from whose graduates the Order draws its members. On the other hand, it is responsible for preserving the achievements of art and culture while cultivating the use of the intellect for its own sake, supporting a large community of scholars free to specialise in any discipline – each of which is presided over by a Master, from Music and Mathematics to Linguistics and Astronomy – and a smaller community of aesthetes free to synthesise elements of every discipline – the Glass Bead Game players, lead by the Magister Ludi.

Hesse presents Castalia as the natural evolution of the ideal underlying the modern university – the *universitas litterarum* – encapsulating the humanist search for knowledge and self-understanding, by uniting teaching, research, liberal arts, and exact sciences in the same institution.[7] In establishing the Game as the symbol of Castalian culture, he presents it as the embodiment of this ideal:

> The same eternal idea, which for us has been embodied in the Glass Bead Game, has

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5  Ibid.

6  Ibid., pp. 352-355.

7  The notion of a *universitas litterarum* (corporation of letters) was articulated in opposition to that of a *universitas personarum* (corporation of persons). It played an important role in the constitution of Berlin's Humboldt-Univerzität, which is the institutional model for modern research universities. It is a significant fact that Hegel was one of this institution's founding faculty members.

underlain every movement toward the goal of a universitas litterarum, every Platonic academy, every league of an intellectual elite, every *rapprochement* between the exact and the more liberal disciplines, every effort toward reconciliation between science and art or science and religion.[8]

However, the Game also symbolises the form that this reconciliation takes within Castalian culture. Castalians study scripture and theology, music and poetry, and can appreciate and even recreate their subtle nuances, but they are neither believers nor artists, refusing either to practice or to create.[9] The Game's combination of high ritual and subtle creativity enables it to subsume the role of both religion *and* art within Castalian society. This subsumption is not merely a shift in the value placed in certain activities – it corresponds to a change in the understanding of value *as such*.

It is easy to dismiss the Castalian attitude to religion as a mere consequence of its explicit fidelity to the enlightenment, but the Castalian attitude to art indicates an implicit fidelity to an entirely different historical moment – the End of History. This is not the ultimate triumph of Western liberal democracy proposed by Francis Fukuyama during the collapse of Eastern bloc communism,[10] but the teleological plateau in the evolution of our collective self-consciousness articulated by Hegel across his various philosophical works.[11] Hegel is the philosopher most often invoked in the course of the novel.[12] He holds not only that the world is in truth Absolute Spirit – the unity of Absolute Idea (God) and its self-externalisation (Nature) – and that world history is the process through which Spirit (as Culture) realises itself (as Freedom) by achieving progressively greater self-consciousness, but that self-consciousness of this very truth is progressively manifest in art (as sensuous intuition), religion (as pictorial thinking), and ultimately philosophy (as conceptual thinking).[13] Hegel does not see the end of art or religion as the point at which they cannot be pursued any further and thus must be abandoned, but as the point at which their role as privileged

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8  *GBG*, p. 16.
9  Ibid., p. 27. The exception to this ban on creation are the fictional 'lives' that each student is supposed to compose during their years of free study.
10  Francis Fukuyama, 'The End of History?' in *National Interest*, Summer 1989.
11  I would identify the *Science of Logic* and *Lectures on the History of Philosophy*, the *Philosophy of Right* and *Lectures on the Philosophy of History*, and the *Lectures on Aesthetics* and *Lectures on the Philosophy of Religion* as covering the important intellectual, political, and cultural elements of this thesis, respectively.
12  There is one explicit reference to Hegel as a precursor to the Game (p. 16), but there are many more references to the Game's capacity for dialectical synthesis of opposing positions (cf. pp. 40, 81) and even its expression of 'the Cosmic Soul' (p. 445), in addition to the advanced seminars that Knecht runs on dialectics as Magister Ludi (p. 227). He is also explicitly mentioned as an influence upon Knecht (p. 91) and treated as a foil in various arguments (pp. 122, 351-352).
13  G.W.F. Hegel, *Aesthetics: Lectures on Fine Art*, trans. T.M. Knox (Oxford University Press, 1975), Part I: Introduction, pp. 91-105.

forms of cultural self-consciousness has been subsumed by philosophy.[14] Hegel's own philosophy marks the End of History by realising this subsumption – constituting the foundation for all future progress in spiritual self-consciousness.

We must be careful in articulating Castalia's Hegelian characteristics. Hesse makes it quite clear that, for all its conceptual subtlety, the Glass Bead Game is not philosophy:

> Philosophizing should be done only with legitimate tools, those of philosophy. Our Game is neither philosophy nor religion; it is a discipline of its own, in character most akin to art. It is an art *sui generis* [...] The philosopher Kant [...] once said that theological philosophising was 'a magic lantern of chimeras.' We should not make our Glass Bead Game into that.[15]

This is sufficient to discourage us from seeing the Game as the symbol of Hegelian philosophy. Nevertheless, the manner in which Castalia realises the ideal of comprehensive humanistic inquiry exemplifies Hegel's account of the historical trend towards increasing collective self-consciousness through the evolution of social institutions. The prohibition on artistic creation reflects the notion that art has nothing more to tell us about ourselves, restricting the role of artistic institutions to preserving the memory of lessons already learned. The ascension of the Game reflects the notion that the true value of art (Beauty) lies in enabling self-consciousness – by *expressing* the Idea of Freedom in various forms (e.g., in the emotional range of song or the ethical conflicts of Greek tragedy) – insofar as the Game aims at this same value more directly – by *exploring* the freedom of thought itself (e.g., exposing mathematical analogies between disparate themes or resolving tensions between conflicting concepts).[16]

For Hegelian and Castalian alike, the essence of our freedom is the capacity for rational thought (Reason), and it is therefore unsurprising that each seeks the highest consciousness of freedom in the pure exercise of this capacity – either *contemplating* the Absolute or *playing* the Game. Still, there are deeper connections between their conceptions of freedom. There is a long tradition in German philosophy that aims to overcome the perceived opposition between freedom and duty.

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14 Arthur Danto provides a nuanced reading of Hegel's account of the end of art, its opposition to romanticism, and its relevance to modern and contemporary art in his essay 'Hegel's End of Art Thesis' (1999, available here: http://rae.com.pt/Danto%20hegel%hegel%20end%20art.pdf). An alternative reading is provided by Hans-Georg Gadamer in his essay 'The Relevance of the Beautiful' in *The Relevance of the Beautiful and Other Essays* (Cambridge University Press, 1986).

15 *GBG*, p. 141.

16 Knecht even comes close to describing the Game as consciousness of the Absolute at one point (GBG, p. 121): "For the dark interior, the esoterics of the Game, points down into the One and All, into those depths where the eternal Atman eternally breathes in and out, sufficient unto itself."

This tradition has two interlocking components. The first, initially developed by Kant, is the idea that individual freedom consists not in the availability of options for action, but in the capacity for *rational self-determination*. This means the capacity to respond to reasons for action (e.g., moral duty) constrained neither by external authority (e.g., arbitrary political power) nor internal desire (e.g., arbitrary libidinal impulse). The second, skilfully elaborated by Hegel, is the idea that this freedom can nevertheless be realised through social institutions. This means that socially imposed constraints on some forms of action (e.g., taxes on personal spending) can simultaneously enable others (e.g., investment in shared services), and that the net result can be an overall increase in individual freedom.[17] Together, these explain the exercise of legitimate authority as bound by a corresponding responsibility to fulfil some role within a social institution that realises freedom.

It is easy to see how this tradition provides a framework for conceptualising "a new and sufficient authority arising out of Reason itself."[18] This is born out by the way its ideas infuse the structure of the Order: scholars understand their monastic constraints as enabling their unconstrained research, teachers understand their pedagogical duties as a function of the institution's role in the wider society, and administrators understand their advancement within the hierarchy as conveying authority only on the condition of further responsibility to the institution and its aims.[19]

Hegelian themes are thus clearly present in the understanding of *value* embodied by Castalia (and its Game) and the understanding of *freedom* embodied by the Order (and its hierarchy), but these are largely enveloped within the novel's engagement with the concept of *history*. According to Knecht, Castalians have "no confidence in that so-called philosophy of history of which Hegel is the most brilliant and most dangerous representative."[20] Yet this official rejection belies a deeper affinity manifest in the Castalian attitude to history, exhibited by the future historians quoted earlier, and articulated by Knecht's Benedictine interlocutor Father Jacobus:

> "You mathematicians and Glass Bead Game Players," he would say, "have distilled a kind of world history to suit your own tastes. It consists of nothing but the history of ideas and of art. Your history is bloodless and lacking in reality. [...] You treat world history as a mathematician does mathematics, in which nothing but laws and formulas exist, no reality, no

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17 There remains some controversy over whether the social institutions of modern Prussia – family, civil society, and the state – form a necessary political component of Hegel's End of History. The point is moot for our purposes.

18 *GBG*, p. 19.

19 These are reflected in the various discussions of freedom within the Order throughout the novel (*GBG*, pp. 73-75, 179, 377).

20 *GBG* p. 351. It is significant to note that Hesse based the character of Father Jacobus on the cultural historian and noted critique of Hegel's philosophy of history, Jacob Burckhardt (cf. Ziolowski).

good and evil, no time, no yesterday, no tomorrow, nothing but an eternal, shallow mathematical present."[21]

Knecht's life as a student in Castalia and member of the Order serves to justify this assessment – from his early debates with Plinio Designori defending Castalia against the world beyond, through his involvement in the political relations between the two in winning Father Jacobus to his side, to his later frustrations with Fritz Tegularius – Knecht comes to appreciate both the historical and political conditions of Castalia's existence *and* its systematic ignorance of these conditions. Castalians act as if their province is a *world-historical* achievement that cannot be undone – as if the history of societies mirrored the history of ideas, in which nothing is lost to the memory of scholars.[22]

In becoming Magister Ludi, Knecht achieves a singular position in Castalian society, combining the highest authority and highest responsibility toward the symbol of its governing ideal – the Glass Bead Game. However, we should not assume that his eventual decision to abdicate his position is a straightforward rejection of this ideal. Knecht is in a better position to appreciate the value of Castalia and the Game than anyone, but he is also in a better position to appreciate their historical precariousness. He sees that the unique 'nonutilitarian' value which makes the Game so precious is precisely what puts it in danger, and that treating it as the culmination of a teleological development incorporating science, art, and religion does nothing to assuage this danger.[23] Knecht's conviction that the Game will one day be abandoned is emblematic of his attitude to Castalia as a whole.[24] When he forsakes his duty to Castalia for a duty to the wider world, it is because he sees the latter as a personal duty that is neither mediated nor constrained by worldly institutions, insofar as individuals and institutions are equally subject to the whims of history.[25]

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21 *GBG*, p. 168.
22 This sentiment is reflected perfectly in Knecht's initial awareness of the value of the Game (*GBG*, p. 119): "the thought abruptly shot through me, with a joyful, startled amazement, that despite the decay and death of that language it had not been lost, that its youth, maturity, and downfall were preserved in our memory, in our knowledge of it and its history, and would survive and could at any time be reconstructed in the symbols and formulas of the Glass Bead Game."
23 *GBG*, p. 360-362.
24 This conviction is explicitly discussed (Ibid.), but it is also presented poetically in 'The Last Glass Bead Game Player' (p. 435). It is worth comparing this to the poem immediately preceding it ('On Reading an Old Philosopher'), insofar as it seems to capture the novel's ultimate ambivalence towards Hegel: "As if there dwelt within us cognizance; That everything must whither, die, and fall. Yet still above this vale of endless dying; Man's spirit, struggling incorruptible; Painfully raises beacons, death defying; And wins by longing, immortality." (p. 434).
25 *GBG*, p. 377. It is also possible to see the influence of Kierkegaard's criticisms of Hegel in this choice. The word 'knecht' is of course German for 'serf' or 'servant', and it is remarked by the Music Master that this indicates Knecht's suitability for the peculiar freedom of the Order (p.73), but it is also the root of 'knight' and as such resonates with Kierkegaard's 'knight of faith' who follows a personal duty that cannot be rationally articulated within an ethical/institutional context (cf. *Fear and Trembling*). This inability to articulate his call to duty is certainly indicated in Knecht's final debate with Alexander (pp. 381-404) but it remains in tension with the

Knecht's break with the Hegelian conception of history thus forces him to re-evaluate the conceptions of freedom and value lodged within it, but the result is more of a re-orientation than a rejection.[26] This is best indicated by the quotation with which Knecht ends the circular letter explaining his thinking:

> "Times of terror and deepest misery may be in the offing. But if any happiness at all is to be extracted from that misery, it can be only a spiritual happiness, looking backward toward the conservation of the culture of earlier times, looking forward toward serene and stalwart defense of the things of the spirit in an age which otherwise might succumb wholly to material things."[27]

The life of the mind that the Game symbolises retains its *unconditional* value (Beauty), but it must ever be practically subordinated to the *conditions* under which it can be realised (Right). This implies a new compact between Castalia's two roles, in which its pedagogical responsibilities toward the world beyond must be prioritised over its aesthetic devotion to thought for its own sake. It is thus possible to read Knecht's abandonment of the Game as an allegory concerning the balance between research and teaching as much as the *vita contempliva* and the *vita activa*.

## 2. The Game of Games

Perhaps the most significant feature of the above interpretation is that the symbolic role of the Glass Bead Game has little to do with its status *as a game*. Of course, much of the Game's symbolic power derives from the fact that it is described obliquely, through various suggestive analogies and allusions, including its very name, which refers to its mathematical origins in the manipulation of special abacuses, rather than anything to do with its modern practice.[28] Despite many earnest attempts to devise rules by which the Game could be played in reality, none has come close to capturing the air of sublime mystery and intellectual subtlety that Hesse so deftly weaves about it.[29] Nevertheless, there is more to the Game *qua* game than is required for the symbolic role already described, and more to the core themes of freedom and value that can be revealed by disentangling them from the concept of history and connecting them to the concept of game. I will now endeavour

overarching rationale for leaving the Order that has been carefully constructed over the course of the novel.

26 This reflects Hesse's own re-orientation in the course of writing the novel, from depicting a seeming utopia to criticising the principles underlying it (cf. Ziolowski).

27 *GBG*, p. 363. As Zioloswki points out (p. 59), this is in fact a direct quotation from Burckhardt's 'The Revolutionary Age'.

28 *GBG*, pp. 31-32.

29 There is a wiki devoted to cataloguing these attempts (http://www.ludism.org/gbgwiki/HomePage, accessed 19/10/2015).

to address these details of the Game and elaborate their further philosophical significance.

Hesse provides an overview of the origins of the Game in the historians' introduction to Knecht's biography, and describes its general character and how it is played at various points throughout the book. The following passage is perhaps the most representative:

> Under the shifting hegemony of now this, now that science or art, the Game of games had developed into a kind of universal language through which the players could express values and set these in relation to one another. Throughout its history the Game was closely allied with music, and usually proceeded according to musical or mathematical rules. One theme, two themes, or three themes were stated, elaborated, varied, and underwent a development quite similar to that of the theme in a Bach fugue or a concerto movement. A Game, for example, might start from a given astronomical configuration, or from the actual theme of a Bach fugue, or from a sentence out of Leibniz or the Upanishads, and from this theme, depending on the intentions and talents of the player, it could either further explore and elaborate the initial motif or else enrich its expressiveness by allusions to kindred concepts.[30]

The heart of the Game is its *language* – an ideographic script comparable to Chinese, whose vast and scrupulously maintained lexicon enables it to communicate ideas from any discipline, and whose subtle yet mathematically precise syntax enables it to express correspondences between ideas across disciplinary boundaries.[31] This aspires in some ways to the notion of a *characteristica universalis* proposed by Leibniz and developed by subsequent philosophers.[32] However, while it certainly realises the encyclopedic ambition of Leibniz's proposal, it falls short of the corresponding logical ambition of a *calculus rationator* – a universal framework in which every dispute between competing intellectual positions can be resolved by means of demonstration. By contrast, the Game develops the affinity between mathematics and music into a *lingua sacra* – a sacred language in which every harmony, symmetry, or counterpoint between disparate themes can be represented as a pure aesthetic abstraction.[33] This opposition manifests an incipient tension between the *universitas litterarum* as a search for Truth, and the Game as a search for Beauty.

The selection of a given Game's themes and even something of their progression can be decided in

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30 *GBG*, pp. 39-40.
31 *GBG*, pp. 14-15, 36-37.
32 An overview of the history of the idea from Leibniz onward can be found in Barry Smith, 'Characteristica Universalis', in K. Mulligan (ed.), *Language, Truth and Ontology* (Dordrecht/Boston/London: Kluwer, 1992).
33 *GBG*, pp. 118-121.

advance, and Knecht spends much time in the novel composing and comparing such Games in private.[34] However, the Game proper is meant to be played in public, by a number players, whose contributions to the way the themes unfold will distinguish it from any other Game based on the same themes,[35] and whose mutual co-operation can decisively determine the overall success of the Game.[36] Moreover, there are periods of meditation on the content of moves prescribed at crucial intervals throughout the Game. The initial purpose of this was to discourage competition between virtuoso players at the expense of the overall shape of the Game,[37] but ultimately became an important feature to which certain 'psychological' styles of play were devoted.[38] There is more to be said about the styles of play that are described throughout the book, such as the seemingly popular dialectical synthesis of opposing themes (e.g., freedom and law),[39] and Tegularius's countervailing preference for the tragic failure of such syntheses.[40] There is equally more to be said about the tantalising examples of Games that litter the book, from the schoolboy exercise begun with a fugal theme and a sentence of Confucius that Knecht spends his years of freedom translating into ordinary language,[41] to the public Game based on the plan of a traditional Chinese house and the hexagrams of the I-Ching carefully devised by Knecht and Tegularius for his public debut as Magister Ludi.[42] Nevertheless, neither adds substantially to the outline of the Game already provided, and we are better off pursuing extra-textual avenues of understanding.

i) Three Threads in the Theory of Games

The concept of *play* was a significant concern of German philosophy, beginning with Kant's account of the free play of the faculties in the experience of Beauty,[43] and developed in Schiller's account of the play-instinct as the essential unity of man's active and passive dimensions,[44] before passing into psychoanalysis in Freud's theory of drives[45] and hermeneutics in Gadamer's theory of

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34 The best example is Knecht's composition of a Game for the annual competition during his time at Mariafels (*GBG*, pp. 195-202).
35 *GBG*, p. 14-15.
36 This is demonstrated by the disastrous Game planned by Thomas van der Trave but led by Bertram, the previous Magister Ludi's shadow, which is deliberately ruined by the elite players as a snub to Bertram (GBG, pp. 210-216).
37 *GBG*, p. 38-39.
38 *GBG*, p. 197.
39 *GBG*, p. 40.
40 *GBG*, pp. 147-148. It is quite clear that Fritz Tegularius is based on Friedrich Nietzsche (cf. Joseph Mileck, *Herman Hesse: Life and Art* (University of California Press, 1978), p. 272-275), and this stylistic opposition neatly reflects the opposition between the Hegelian and Nietzschean accounts of history as progressive reconciliation and perpetual struggle, respectively.
41 *GBG*, pp. 120-125.
42 *GBG*, pp. 245-249, 261-264.
43 Immanuel Kant, *Critique of the Power of Judgment* (Cambridge University Press, 2002).
44 Friedrich Schiller, *On the Aesthetic Education of Man* (Angelico Press, 2015), Letters XIV and XV.
45 Sigmund Freud, *Beyond the Pleasure Principle* (London, Vienna: Intl. Psycho-Analytical, 1922), Part II. It would

art.[46] However, this concern did not really extend to the concept of *game*, which only began to be theorised on its own terms during the writing of *The Glass Bead Game* (begun in 1933) and the decades following its publication (1946), in three distinct fields: *mathematics*, *philosophy*, and *sociology*.

Mathematicians have been interested in games of chance since the beginning of probability theory, and have ventured limited analyses of strategies in these and other games since the 18th century, but it was only in the early 20th century that something like a general framework for studying games and proving theorems regarding them began to emerge, achieving explicit form in Jon von Neumann and Oskar Morgenstern's *Theory of Games and Economic Behaviour* (1944) and full generality with John Nash's 'Non-Cooperative Games' (1951).[47] The *game theory* that emerged from these innovations is essentially the study of *interactive decision spaces* constituted by rules that fix the players' possible actions (e.g., the permissible movements of chess pieces), the relations between them (e.g., the fact that taking an opponents piece limits their possible actions), and the goal states or *payoffs* they are presumed to aim at (e.g., checkmate).[48] Such study delineates *strategies* for achieving specific goals under certain conditions (e.g., ensuring checkmate given a particular endgame configuration), which choose *plays*, or paths through the decision space, in response to the actions of other players. The limit-case of this is a *winning strategy*, which guarantees the desired outcome no matter how the other players act. These strategies only exist in so called deterministic games (e.g., chess, checkers, etc.), and even then only some of these games are tractable enough to have been *solved* (e.g., tic-tac-toe).

The contrast between deterministic and non-deterministic games is only one aspect of the rich taxonomy that game theory has developed since its inception, incorporating distinctions between types of action (i.e., simultaneous/sequential, discrete/differential, and finite/infinite), types of payoff (i.e., co-operative/competitive, zero-sum/open-sum), and types of information (i.e., perfect/imperfect and complete/incomplete). However, this taxonomy includes many activities that

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also eventually pass into hermeneutics in Gadamer's philosophy of art (cf. *Truth and Method* (Continuum, 2004), Part I, chapter 2), and ultimately into deconstruction in Derrida's philosophy of language (cf. 'Structure, Sign, and Play in the Discourse of the Human Sciences' in *Writing and Difference* (Routledge Classics, 2001)).

46  Hans-Georg Gadamer,

47  A detailed introduction to the basic concepts and formalisms of game theory can be found in Joel Watson's *Strategy: An Introduction to Game Theory* (Norton and Company, 2013), and a general overview is provided in the 'Game Theory' entry of the Stanford Encyclopedia of Philosophy (hereafter SEP, all entries last accessed 19/10/2015). In addition, a fairly comprehensive timeline covering the important developments in the history of game theory has been compiled by Paul Walker (http://www.econ.canterbury.ac.nz/personal_pages/paul_walker/gt/hist.htm).

48  I must confess that 'interactive decision space' is not a technical concept in game theory, but it usefully conveys the thoroughly *spatial* delimitation of interactive decision provided by describing a game in *extensive* form.

we would not usually describe as games (e.g., purchasing negotiations, the prisoners dilemma, nuclear war), and excludes many activities we would so describe (e.g., playing with dolls, word association, Dungeons and Dragons). Moreover, many non-deterministic games included in the taxonomy partially resist strategic analysis (e.g., baseball), insofar as the *actions* they involve cannot simply be reduced to *decisions* (i.e., one does not simply *decide* to hit a home run). Stochastic games such as backgammon are both non-deterministic and completely captured by game theory, insofar as the uncertainty they involve is strictly *circumscribed* by the rules (even if it i s *realised* by rolling dice, shuffling cards, or computerised random number generation). By contrast, the uncertainty involved in baseball, competitive martial arts, or a scavenger hunt is only *mediated* by the rules, insofar as they incorporate elements of the world into the game (e.g., equipment, players, locales). This extrinsic uncertainty must then be folded back into game theory by incorporating independent causal and statistical analysis of these elements (e.g., hitting mechanics and sabermetrics). The only way to solve baseball would thus be to 'solve' the corresponding features of reality.

The first part of Wittgenstein's *Philosophical Investigations* – completed around the same time as *The Glass Bead Game* (1946) – contains the most influential philosophical discussion of the concept of game in the 20th Century[49]. It is most famous for applying the concept to linguistic analysis by introducing the notion of *language-games*.[50] This pictures language as a patchwork of interactive activities, each governed by its own rules and oriented by different goals, from co-operative co-ordination of joint tasks to adversarial debate over conflicting beliefs. It is equally notorious for its reflections on the nature of these *rules*, trying to understand how it is possible to follow them and apply them in new contexts.[51] These complicate the picture by showing the extent to which rules are found in implicit practices as opposed to explicit instructions, and by highlighting the ways in which they are reinterpreted and extended within these practices. However, there is a peculiar circularity in Wittgenstein's use of the concept of game. He claims that there are no essential features shared by those activities we call 'games' (e.g., chess, tic-tac-toe, solitaire, tennis, ring-a-ring-a-roses, or throwing a ball against a wall), but only "a complicated network of similarities overlapping and criss-crossing; sometimes overall similarities, sometimes similarities of detail […] I can think of no better expression to characterize these similarities than "family resemblances""[52] This family resemblance analysis is what enables his analogy between language

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49 The completed book was only published posthumously in 1953.
50 Ludwig Wittgenstein, *Philosophical Investigations* (Blackwell, 2001), §7.
51 Ibid., §§200-129. Much of its infamy derives from Saul Kripke's interpretation in *Wittgenstein: On Rules and Private Language* (Jon Wiley and Sons, 1984) and the debates it inspired.
52 Wittgenstein, §§66-67.

and games to convey the irreducible plurality of linguistic activity. The circularity lies in the fact that he uses this same analogy to motivate the family resemblance analysis.[53]

This peculiar circularity is jettisoned by Wilfrid Sellars in 'Some Reflections on Language Games' (1954).[54] Sellars provides necessary if not sufficient conditions for an activity to constitute a game by elaborating Wittgenstein's account of the conditions under which it is possible to *follow* implicit norms without *obeying* explicit rules, establishing a connection between every game and a putative *meta-game* whose moves consist in stating and responding to the rules of the *object-game*.[55] This leads him to reject Wittgenstein's linguistic pluralism, insofar as it reveals a common language game at the heart of every such meta-game – what he will later call 'the game of giving and asking for reasons'.[56] Sellars thus founds a new theory of language games in which the analogical connection between language and games is transformed into something more substantive, mediated by the centrality of the 'game' of reasoning; this theory is then developed further by Robert Brandom under the twin headings of *normative pragmatics* and *inferential semantics*.[57] Together, Sellars and Brandom reconnect Wittgenstein's ideas about language and rules with the account of freedom as rational self-determination developed by Kant and Hegel.[58]

The foundational text in the sociology of games is Johan Huizinga's *Homo Ludens* (begun in 1933 and published in 1938).[59] Huizinga does not really present a theory of games as a distinct form of activity, but rather aims to provide a theory of play as the root of all culture, expressed in everything from law and language to war and religion. He defines play as an activity that displays four connected features: *freedom* of action, *independence* from ordinary life, *delimitation* in space and time, and *governance* by fixed rules.[60] Play thus tends to be parcelled out into discrete activities, which become games or rituals as the limits/rules that separate them from ordinary life are formalised:

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53 Ibid., §§67-71.
54 Wilfrid Sellars, 'Some Reflections on Language Games', *Philosophy of Science*, Vol. 21, No. 3. (Jul., 1954), pp. 204-228.
55 Ibid., §§16-19.
56 Robert Brandom, *Articulating Reasons* (Harvard University Press, 2000), p. 189.
57 Cf. Robert Brandom, *Making It Explicit* (Harvard University Press, 1994).
58 Sellars pursues this connection through the sequence of papers 'Ontology, the A Priori, and Kant', 'Kant's Theory of Experience', 'Metaphysics and the Concept of a Person', and 'On Knowing the Better and Doing the Worse', collected in order in *Kant's Transcendental Metaphysics* (Ridgeview Publishing, 2002). Brandom develops the connection at various points, most importantly in *Making it Explicit* (ch. 1) and the Woodbridge lectures collected in first three chapters of *Reason in Philosophy* (Harvard University Press, 2013).
59 Johan Huizinga, *Homo Ludens: A Study of the Play Element in Culture* (Routledge and Kegan Paul, 1949).
60 Ibid., pp. 8-11.

The arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court, the court of justice, etc., are all in form and function play-grounds, i.e. forbidden spots, isolated, hedged round, hallowed, within which special rules obtain. All are temporary worlds within the ordinary world, dedicated to the performance of an act apart.[61]

Although Huizinga agrees with Schiller that the play-instinct is an essential feature of humanity, he does not think it is unique to humans. He sees the same 'irrational' drive at work in the behaviour of kittens and chess masters.[62] The reason we are properly designated *homo ludens* (rather than *homo sapiens* or *homo faber*) is that this drive animates us to create and maintain these 'temporary worlds within the ordinary world' to a degree found nowhere else in nature, resulting in the evolving networks of semi-autonomous social practices that constitute our cultures.

Huizinga's failure to adequately define 'game' inspired Roger Caillois to provide the first comprehensive account of the concept in *Man, Play, and Games* (1959).[63] Caillois claims that Huizinga's definition of play equally includes activities that aren't games (e.g., religious ritual, legal debate, poetic composition) and excludes activities that are (i.e. non-competitive games and gambling for profit).[64] However, he aims to revise rather than reject Huizinga's 'magic circle' approach.[65] He agrees with Huizinga that games are essentially *free* from obligation, and *separate* in space and time. He thinks that they are less independent than *unproductive*, contributing nothing new to ordinary life, but permitting redistribution of resources amongst players (as in gambling). He also thinks that while games necessarily involve players and things taking on roles (e.g., white/pawn, pitcher/base, astronaut/spaceship), this can take the form either of *governance* by rules or *make-believe*. His distinctive innovation is to insist that the outcomes of games are essentially *uncertain.* These six common features give way to a comprehensive taxonomy of games, organised around four fundamental categories:

I am proposing a division into four main rubrics, depending on whether, in the games under consideration, the role of competition, chance, simulation, or vertigo is dominant. I call these *agôn*, *alea*, *mimicry*, and *ilinx*, respectively. All four indeed belong to the domain of play. One *plays* football, billiards, or chess (*agôn*); roulette or a lottery (*alea*); pirate, Nero, or Hamlet (*mimicry*); or one produces in oneself, by a rapid whirling or failing movement, a state

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61 Ibid., p. 10.
62 Ibid., p. 4.
63 Roger Caillois, *Man, Play, and Games*, trans. Meyer Barash (University of Illinois Press, 2001).
64 Ibid., pp. 3-5.
65 Ibid., pp. 5-10.

of dizziness and disorder (*ilinx*).[66]

Caillois thinks that some combinations of these categories are permissible, such as the perennial pairing of *agôn* with *alea* (e.g., backgammon, poker, etc.), but that others are incompatible, such as *agon* with *ilinx* and *alea* with *mimicry*.[67] Furthermore, he proposes 'a continuum between two opposite poles' along which the games in each category can be arrayed, representing the conflict between *paidia* – the 'frolicsome and impulsive exuberance' associated with free improvisation and the unstructured play of animals and children – and *ludus* – the countervailing 'tendency to bind [*paidia*] with arbitrary, imperative, and purposely tedious conventions' associated with the formalised games of adults.[68] Caillois presents this disciplining of *paidia* by *ludus* as the historical process through which the categories have come into their own as specific forms of play (e.g., sport, gambling, theatre), and begotten corresponding forms of culture (e.g., educational competition, economic speculation, political ceremony); though *ilinx* is distinguished primarily by its resistance these developments.[69] His expanded sociology of games thereby lays the foundations for a 'sociology derived from games'.[70]

ii) The Reason in Games

Having introduced these three traditions, we can now identify important tensions and intersections between them. I shall put to one side the open conflict between Wittgenstein's family resemblance analysis and more direct approaches to the concept of game. Given this omission, the most significant tensions are to be found in the different approaches to the concepts of uncertainty and rationality in the mathematical and sociological traditions. It is best to see Caillois's emphasis on the *uncertainty* of outcomes as a development of Huizinga's emphasis on the *freedom* of players. If this freedom is to be more than the availability of options (e.g., the choice of different tokens in Monopoly: boot, dog, hat, etc.), then the game must suggest *reasons* for choosing between courses of action (e.g., defeating an opponent, scoring points, or playing elegantly); but if these reasons are to be something other than further restrictions imposed by the rules, then the courses of action they prescribe must be uncertain.[71] This argument reveals the paradox of game theory – its tendency to

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66 Ibid., p. 12.
67 It is worth noting that roleplaying games of various forms (i.e., tabletop, computer based, and live-action) undermine Caillois's rigid separation of *alea* and *mimicry*.
68 Caillois, pp. 13-14.
69 Ibid., pp. 27-33, 36, 54.
70 Ibid., p. 67.
71 One way of understanding this uncertain prescription is in terms of the *non-monotonicity* (or *defeasibility*) of most inferences. Brandom provides a compelling account of non-monotonicity in chapter 4 of *Between Saying and Doing* (Oxford University Press, 2010). A good survey of formal approaches to non-monotonic logic can be found in

minimise the uncertainty of the games it studies, effectively eliminating it in deterministic games. This explains why fully and even partially solved games are often described as 'broken' by those interested in actually playing them. One is not obligated to win such games just because one can, but this freedom is a *mere* option, because it can only be chosen for reasons contrary to 'the spirit of the game'.

However, the above argument also reveals a commitment to something like rational self-determination implicit in adherence to 'the spirit of the game' at odds with Huizinga's claim that play is 'irrational' and Caillois's consequent account of *paidia*. If we look more carefully at Caillois's account, he says that a game "consists of the need to find or continue at once a response which is free within the limits set by the rules."[72] This distinction between the *need* motivating the response and the *rules* limiting its form is obscured in the opposition between *paidia* and *ludus*, insofar as the latter ignores the difference between formalising motivations *for* action and formalising limitations *upon* action. The overall effect of this is that the absence of constraint characteristic of *paidia* becomes associated with the presence of spontaneity, wherein the *specific* motivations of play (e.g., the kitten's hunting practice, the child's sense-making of adult behaviour, etc.) are subsumed by a *general* creative drive (i.e., the will to experiment, the artistic impulse, etc.). The opposition between *paidia* and *ludus* is thus framed as a conflict between irrationality, creativity, and freedom, on the one hand, and rationality, strategy, and law, on the other. It is tempting to acquiesce to this framing, if only to position game theory's paradoxical tendency to 'break' games as the pyrrhic victory of *ludic rationality* over *paidaic irrationality*, but this would mean abandoning the rational motivation implicit in 'the spirit' of games that makes sense of their essential uncertainty. It would permit trivial uncertainty, consisting in the unpredictability of the player's moves rather than their consequences.[73]

We should rather see game theory as capturing only some of the motivations at work in games – those that can be precisely modelled by payoff functions and preference rankings – and thus as providing a truncated theory of rationality.[74] Games with strictly formalised rules can incorporate

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David Mackinson's 'How to Go Non-Monotonic' in the *Handbook of Philosophical Logic*, 2nd edition, Volume 12, ed. D.M. Gabbay and F. Guenther (Springer, 2005).

72 Ibid., p. 8, emphasis altered.

73 This lets us develop the resistance of *ilinx* to *ludus* into a more concrete suspicion regarding its status as a fundamental category of games. The vortical flailing of children that remains the paradigm of ilinx is little more than random action, and its vertiginous consequences are entirely reliable. Randomness aside, it is unclear why these particular affective consequences should qualify an activity as play.

74 Robert Brandom has presented an excellent account of the limitations of decision theoretic accounts of practical reasoning in the introduction to *Tales of the Mighty Dead* (Harvard University Press, 2002) and neo-Humean approaches more generally in *Articulating Reasons* (ch. 2).

surprisingly subtle systems of motivation, from *goals* that incorporate the uncertainties of the world (e.g., competitions to design better bridges, robots, etc.) to *values* that shape the evolution of preferences (e.g., collaborative composition of beautiful narratives, melodies, etc.). Combined with the incredible ingenuity displayed by the master strategists of the ludic arts (e.g., chess masters, *Magic: The Gathering*™ champions, etc.), this is sufficient to demolish the idea that creativity is somehow opposed to rationality – it is not a singular wellspring of novelty opposed to the concrete diversity of purpose. We have seen that the Glass Bead Game symbolises many things, but its hyperbolic synthesis of ludicism and aestheticism makes it the perfect emblem of this rapprochement of reason and creativity.

iii) The Games in Reason

Beginning with the *antilogikê* of the ancient Greeks, its formalisation in Socrates's method of *elenchus* and Aristotle's *dialectics*,[75] and its further development in the medieval practice of *obligationes*,[76] there is a long tradition of using competitive games to formalise dialogical reasoning. Lewis Carroll's *The Game of Logic* (1886) even used non-competitive games to elucidate syllogisms in monological reasoning.[77] The intersection of the mathematical and philosophical traditions in the mid 20th century renewed and reoriented these ideas, suggesting new approaches to the study of logic that were notably distinct from the dominant methods of *proof theory* and *model theory*.[78] Though they are grouped together as 'game semantics' the original approaches were developed separately in Paul Lorenzen's work on *dialogue games* and Jaakko Hintinkka's work on *game-theoretic semantics* (GTS) during the 1960s.[79] The basic idea behind both approaches is that sentences/formulas (syntax) can be interpreted as propositions (semantics)

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75 Cf. B. Castelnérac and M. Marion, 'Antilogic' in *The Baltic International Yearbook of Cognition, Logic, and Communication*, Vol. 8, 2013, pp. 1-31.

76 Cf. C. Dutilh Novaes, 'Medieval *Obligationes* as Logical Games of Consistency Maintenance'. *Synthese* 145(3), 2005, pp. 371-395.

77 Lewis Carroll, *The Game of Logic* (London: Macmillon & Co., 1886). It is more often made available under his more famous pseudonym than the name it was originally published under (C.L. Dodgson).

78 Proof theory studies logical operators in terms of their roles within formal proof systems, focusing on the *derivability* relation between formulas understood as syntactic objects (A ⊢ B), whereas model theory studies logical operators in terms of their correspondences with independent set-theoretic constructions, focusing on the consequence *relation* between formulas given a semantic interpretation through these correspondences (A ⊨ B). The contrast between these two relations is traditionally used to define the *soundness* (A ⊢ B only if A ⊨ B) and *completeness* (if A ⊨ B then A ⊢ B) of deductive systems. Useful introductions to these topics can be found in the SEP articles 'The Development of Proof Theory' and 'Model Theory'.

79 Cf. Paul Lorenzen, 'Logik und Agon', in *Atti del XII Congresso Internazionale di Filosofia*, volume 4, pp. 187–194, (Florence: Sansoni Editore, 1960); Jaakko Hintikka, 'Language-games and quantifiers', in *Studies in Logical Theory*, ed. N. Rescher, pp. 46–72 (Oxford: Blackwell, 1968). A usefully brief contrast of these origins can be found in Mathieu Marion's 'Why Play Logical Games?' in Ondrej Majer, Ahti-Veikko Pietarinen & Tero Tulenheimo (eds.), *Games: Unifying Logic, Language, and Philosophy*, pp. 3-26 (Springer Verlag, 2009). A more thorough overview is provided by the SEP entries on 'Dialogical Logic' and 'Logic and Games'.

by identifying them with particular games. These games are governed by the same basic rules: they are asymmetric competitions between two players (defender/attacker, proponent/opponent, or myself/nature), the players always have the same basic moves available to them (challenges and responses for the various connectives), and the game ends when one player loses (e.g., by running out of available moves). If the game in general is analogous to chess, then the particular games are analogous to different possible chess scenarios. A proof of a proposition corresponds to a successful play (a sequence of moves) in the scenario that begins with its assertion, and the validity of a proposition corresponds to the existence of a winning strategy (a selection of plays) for the defender in that scenario.

The dialogical approach is closer to proof theory, and is principally concerned with propositional logic. For instance, it explains the difference between connectives for conjunction (A∧B) and disjunction (A∨B) in terms how the game continues when compound propositions containing them are challenged: the attacker gets to choose between conjuncts and the defender gets to choose between disjuncts. There is an important difference between these *particle rules* governing the challenge/response dynamic for each connective and the *structural rules* governing the interaction between players in general. For instance, the structural difference between allowing the defender to respond only to the most recent attack (serial defence) and allowing them to move between attacks (parallel defence) corresponds to the semantic difference between intuitionistic and classical logic (the validity of A∨¬A).[80] GTS is closer to model theory, and is principally concerned with quantificational logic. For instance, it explains the difference between universal ($\sum$xFx) and existential quantifiers ($\prod$xFx) in terms of who gets to choose an object from the model the bound variable (x) ranges over, in order to check whether it satisfies the corresponding formula (Fx), and then interprets the difference between conjunction and disjunction in terms of whether *every* conjunct or *some* disjunct is true in the relevant model.[81] An important feature common to both frameworks is that they understand negation (¬A) as switching the roles of the players: when the defender asserts ¬A, the attacker must assert, and then defend A. Their most important difference lies in their approach to atomic propositions – those containing no connectives (A, B, Fa, Gb, etc.).

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80 Cf. Jesse Alama 'Towards a structure theory for Lorenzen dialogue games', made available on AriXiv (http://arxiv.org/pdf/1311.1917.pdf). It has been shown that many different logics can be modelled simply using novel dialogical structural rules. This simplicity is most striking in the case of connexive logic, for which the alternative semantics are highly complex (cf. S. Rahman and H. Rückert, 'Dialogical Connexive Logic', in *Synthese* 127, 2001, pp. 105–139. Helge Rückert's doctoral thesis (https://openaccess.leidenuniv.nl/handle/1887/12099) presents a broad take on the possibilities of the dialogical paradigm (albeit in several different languages).

81 Its major innovation consists in being able to explain relations of dependence/independence between quantifiers in terms of availability of information. This enables it to model Henkin's branching quantifiers quite neatly. It also raises important questions about the axiom of choice. See the SEP article 'Independence Friendly Logic' for details.

GTS describes *external games* in which atomic propositions can be asserted by either player, because their truth is fixed by a model of the world outside the game that both have access to, whereas the dialogical approach describes *internal games* in which the defender can only assert atomic propositions that the attacker has previously conceded.[82]

The most significant advance beyond these frameworks is *ludics*, developed by Jean-Yves Girard, as a completely new approach to the foundations of logic.[83] Ludics presupposes a deep theoretical background in proof theory, and so my summary of it must be more impressionistic than I would like.[84] What sets ludics apart is that it does not begin with the syntactic elements of a given logical system (i.e., formula syntax and proof syntax) and then find a game whose interactive structure has the right semantic fit (i.e., classical, intuitionistic, connexive, etc.), but rather aims to locate interactive structure in the underlying geometry of the syntax in sequent calculus.[85] Girard uncovers a deep connection between the symmetry of negation in the syntax of classical and linear sequents (A ⊢ is equivalent to ⊢ ¬A) and the symmetry of negation in semantic games (attacking A is equivalent to defending ¬A), but to trace this link to its interactive roots he must strip away the 'bureaucracy' of traditional proofs. This involves two radical ideas – *localisation* and *counterproofs* – that can be usefully explained in terms of the way they suspend trivialities of game semantics.

The first triviality of game semantics is that a proposition corresponds directly to the game that begins with its own assertion. Localisation suspends this by erasing the *names* of these propositions (the formulas: A, Fa, A&B, $\sum$xFx, etc.) and leaving only their *locations* in plays/proofs (with branching *sublocations* indexed by number: ξ, ξ.0, ξ.0.1, ξ.0.1.1, ξ.0.2, ξ.1, etc.). This is made

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82 Cf. Alain Lecomte, *Meaning, Logic and Ludics* (Imperial College Press, 2011), ch. 12.

83 J-Y., Girard, 'Locus Solum: From the Rules of Logic to the Logic of Rules', in *Math. Struct. in Comp. Science* (2001), vol. 11, pp. 301–506. Girard is most famous for inventing linear logic (cf. 'Linear Logic' in SEP), a substructural logic (suspending contraction and weakening) combining the proof-theoretic symmetry of classical negation and the constructive properties of intuitionistic logic, within which both classical and intuitionistic implication can be recovered (using the exponentials '!' and '?'). Linear logic notably possesses both additive and multiplicative connectives for conjunction (& and û ) and disjunction (ù and Ỳ). Ludics builds on research into linear logic by other researchers, most importantly Andreoli's work on focalisation (J-M. Andreoli, 'Logic Programming with Focusing Proofs in Linear Logic', *Journal of Logic and Computation*, 2(3), 1992), but significantly including Blass's work on game semantics for linear logic (A. Blass, 'A game semantics for linear logic', *Annals of Pure and Applied Logic*, 56 (1992) 183-220.).

84 The best short introductions I have found are Girard's 'Ludics: An Introduction' (in H. Schwichtenberg and R. Steinbriiggen (eds.), *Proof and System-Reliability*, (Kluwer, 2002) pp. 167-211), 'Ludics and Anti-Realism' by Alain Lecomte, Myriam Quatrini, and Marie-Renée Fleury (in *Logics and Antirealism,* edited by S. Rahman and J. Symons (Springer, forthcoming)) and 'Go Back to An-Fang' by Olivia L. Fraser (available here: https://www.academia.edu/352702/Go_back_to_An-Fang).

85 A sequent consists in a set of premises (Γ) and a set of conclusions (Δ) divided by a turnstile (Γ ⊢ Δ). The members of these sets are divided by commas (Γ = {A, B}; Δ = {C, D}: A, B ⊢ C, D) that are read loosely as 'and' on the left and 'or' on the right (so from A and B one can infer C or D). Proofs in sequent calculus are represented as a tree of sequents branching upwards from a conclusion, and theorems are represented by one sided sequents (e.g., ⊢ A∨¬A).

possible by Andreoli's method of focalisation, which transforms (linear) proof trees into alternating sequences of *positive* (irreversible) and *negative* (reversible) connective rules that branch upwards from the conclusion. Girard condenses these sequences into alternating applications of a single positive or negative rule that exchange *loci* for *subloci* back and forth across the turnstile (e.g., from $\vdash \xi$ to $\xi.0 \vdash$ to $\vdash \xi.0.1$). He thereby suspends the distinction between compound (A&B) and atomic (A and B) formulas, transforming them into locations ($\xi$) and sublocations ($\xi.0$ and $\xi.1$), so that he can recover the behaviour of the connectives (&) from the properties of polarised trees. The resulting *designs* ($\mathcal{D}$, $\mathcal{E}$, $\mathcal{F}$, etc.) cannot be distinguished by what is asserted/concluded in them, and thus can only be indirectly associated with propositions, by means of the interactive significance (defence/attack) of their geometric structure (positive/negative).

The second triviality of game semantics is that, although there is a correspondence between proofs of a proposition and plays of a game, there are many plays that do not correspond to proofs – the losing ones. If Girard is to uncover the interactive significance hidden in proof syntax, then he must describe *what* these proofs interact with, and *how* they interact with them. Ludics thus includes designs that correspond to losing plays – the bad arguments, paralogisms, and sophistries that logic usually ignores[86] – and studies how these designs act as *counterproofs* – by using the notion of a *cut* (e.g., taking a proof of $\vdash$ A and a proof of A $\vdash$ B and splicing them into a proof of $\vdash$ B) to take two designs ($\mathcal{D}$ and $\mathcal{E}$) with same base loci ($\xi$), but opposing polarities (positive: $\vdash \xi$ as proof/assertion and negative: $\xi \vdash$ as refutation/denial), and produce proofs of contradiction (a proof of the empty sequent $\vdash$). The interaction of these opposing designs (their *dispute*) can then be understood as the process of *cut-elimination* through which proofs containing cuts are deterministically transformed into a normal form that contains none.[87] This process works by pushing the initial cut at the root of the tree up through its branches, splicing the branches of the interacting designs together by matching positive and negative subloci (e.g., cutting $\vdash \xi.0.1$, $\xi.0.2$ with $\xi.0.1 \vdash$ and $\xi.0.2 \vdash$). However, whereas the branches of ordinary proof trees end in atomic leaves (A $\vdash$ A), there are no atoms in ludics. It is thus entirely possible for the normalisation process to diverge, producing an endless dispute – a *fidelity*. It is equally possible for the designs to

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86 Myriam Quatrini has actually translated a number of the rhetorical strategies catalogued by Schopenhauer in *The Art of Always Being Right* into the ludics framework ('Une Lecture Ludique des Stratagèmes de Schopenhauer' available here: http://www.influxus.eu/numeros/article/une-lecture-ludique-des).

87 Not only is there an algorithm for the cut-elimination/normalisation process, but it can be seen as equivalent to function application in the untyped lambda calculus, and thus computation more generally. This is why ludics has received far more attention in computer science than philosophy. However, it is worth mentioning that full computational generality is only achieved by considering interactions between designs that do not form closed nets (i.e., that conclude with $\vdash$).

run out of common subloci, causing the process to halt, producing a failed dispute – a *dissensus*. In order for the process to converge in a manner that produces a successful dispute – a *consensus* – there must be a further rule added to the positive and negative proof rules – the *daimon* – that closes off branches by asserting a sequent without any premises. If one of the opposing designs invokes the daimon, then normalisation converges on a special design – named $\mathcal{D}ai$ – that asserts the empty sequent ($\vdash$) without premises. In this case, the first design to invoke the daimon *loses*. However, though it concedes *victory* to its opponent, this is not the same as conceding the *truth* of the opponent's assertion – it is rather that it has run out of arguments and must insist on *agreeing to disagree*. Designs that interact in this way are described as *orthogonal* ($\mathcal{D}^{™}\mathcal{E}$).

In order to complete the contrast between ludics and game semantics it is necessary to introduce a few more ideas. First, we can make the parallels between proof theory and game theory more precise, by moving from designs as *patterns* (*dessins*) to designs as *plans* (*desseins*). If the *proof tree* contained in a design is seen as analogous to the *decision tree* encoded in a strategy, then one can identify *chronicles* – sequences of alternating positive/negative moves ending with the daimon – as *plays* that traverse a path through the decision tree. Designs as plans can then be understood as sets of chronicles that anticipate the moves of opposing designs insofar as they match (positive to negative) their opposing chronicles. Second, we can now use the notion of orthogonality to identify the interactive structures – *behaviours* – that correspond to propositions in ludics. The *orthogonal set* of a set of designs (e.g., $\{\mathcal{E}, \mathcal{F}\}^{™}$) contains every design that is orthogonal to each individual design within that set (i.e., if $\mathcal{D}^{™}\mathcal{E}$ then $\mathcal{D} \in \{\mathcal{E}, \mathcal{F}\}^{™}$). Girard's search for deep symmetry culminates in the idea that behaviours are sets of designs that are equal to their *bi-orthogonal* ($A = A^{™™}$) – making them *complete* with respect to consensual interaction (with $A^{™}$). Third, though I will not explain how Girard reconstructs the connective rules from relations between behaviours, it is important to explain how he recovers validity: a proposition is valid if the corresponding behaviour contains a *winning design* – or a design that never invokes the daimon before its opponents. This comes very close to game semantics, but differs to the extent that behaviours and designs are only analogous to games and strategies in the game-theoretic sense of these terms. The crucial point for our purposes is that what distinguishes the former from the latter has nothing to do with the space of possible actions, which, though vast, is entirely circumscribed, but concerns the motivations for choosing paths through this space. Ludics locates games in reasoning whose reasons extend beyond those of game theory.

This leads us to the fundamental triviality of game semantics – both the *structure* of its games and the *motivations* they involve presuppose an artificial separation between formalised logic games and ordinary language games.[88] Though the syntactic designs Girard begins with have been stripped of anything that could be construed as *lexical information*, the immense range of possible designs is intended to capture the whole range of possible *linguistic interactions*.[89] This enables ludics to undermine the structural separation between logic and language presupposed by game semantics, by describing the *local* conditions (bi-orthogonality) under which logical structure emerges within the *global* discursive space (the set of sets of designs). It is the peculiar role of the daimon in this description that challenges the corresponding motivational separation between logic and language more broadly. The daimon shows us how *disagreement* is based upon a deeper *agreement*, by demonstrating that the *competition* between opposing positions emerges out of a deeper *co-operation* – the willingness of one player to concede rather than let the dispute diverge. The criterion of bi-orthogonality then takes us 'from the rules of logic to the logic of rules' by showing how *implicit norms* governing discursive competition (behaviours) co-operatively condense within the space of discursive freedom. Ludics is able to reconstruct *explicit rules* for the use of logical connectives by approaching these competitions as *internal games* – assimilating their structures and simplifying their motivations – and identifying those that can be *solved* on this basis; but the more complex motivations that determine the underlying balance between co-operation and competition are neither fixed nor formalised as they are in game semantics.

What this indicates is that Girard's *logical internalism* conceals an openness to *semantic externalism* – an opportunity to realise syntax in linguistic behaviour *within* the world, and to recover semantics by incorporating non-linguistic elements *of* the world. This is supported by the fact that, in ludics, the newly reconstituted atomic propositions (A, B, C, etc.) correspond to interesting interactive structures (non-empty sets of designs), as opposed to empty dialogues (Lorenzen) or pre-given models (Hintikka). The problem lies in circumscribing the connection between these interesting interactive structures and world-involving linguistic behaviours. This is analogous to the question of how the *abstract* musico-mathematical grammar of the sequences of glyphs that compose a Glass Bead Game can capture the range of *concrete* associations between distinct subjects with which it plays. In the novel, any concerns we might have about the Game's

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88  Cf. Marion, 'Why Play Logical Games?'
89  There have been various attempts to use ludics to study speech acts of various kinds, some of which are compiled in A. Lecomte and S. Tronçon (eds.), *Ludics, Dialogue and Interaction: PRELUDE Project – 2006-2009, Revised and Selected Papers* (Springer, 2011).

expressive capabilities are assuaged by the sheer extent of the supporting *lexicographic infrastructure* made possible by the Castalian system – a vast archive articulating the subject matter of every academic discipline into its own unique symbols, an elaborate ideographic index established and maintained by the combined labours of untold specialist scholars.[90] In reality, the problem of relating the syntactic and semantic dimensions of language games is not so easily solved.[91] However, there is a further connection between ludics and the Game worth mentioning. Ludics may locate an ideal of *logical truth* in the simple motivations of internal games (is it the case that A∨¬A?), and it may be open to an ideal of *objective truth* in the complex motivations of external games (is *this* bridge stronger than *that one*?), but these complexities are equally open to *aesthetic ideals* (is *this* theory more elegant than *that one*?). The incipient tension between Truth and Beauty we see in the reasons of the Game is also at work in the games of Reason.

iv) The Space of Reasons and the Magic Circle

This question concerning the parallel relations between syntax and semantics (in language) and internality and externality (in games) brings us to the intersection between the philosophical and sociological traditions. In 'Empiricism and the Philosophy of Mind' (1956),[92] Sellars introduces an important distinction between *the space of reasons* and *the space of causes*, and articulates the problem of perceptual knowledge in terms of the interface between them – how does a sensory stimulus (cause) for which there can be no question of justification give rise to an observational judgment (reason) for which there can? This distinction is significant both because it reframes Sellars's account of the game of giving and asking for reasons (GOGAR) in terms amenable to Huizinga and Caillois's account of the 'magic circle', and because in doing so it reframes his account of the syntax/semantics interface in terms of the rule-mediated incorporation of the external world into an otherwise internal game. However, in order to explain this it is necessary to say something more about Sellars's account of GOGAR and its development by Brandom.

For Sellars, GOGAR is a practice composed by three distinct types of sentence-involving behaviour: *language-entry* transitions (perception), *intra-language* transitions (inference), and *language-departure* transitions (action). Language-entry transitions are the result of behavioural dispositions to endorse sentences on the basis of non-linguistic sensory input (e.g., to assert 'It's

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90  This is supported by Knecht's endeavours to check its functioning during his years of freedom (*GBG*, pp. 120-125.).
91  Though any solution is likely to involve some comparable division of linguistic labour (cf. Hilary Putnam, 'The Meaning of "Meaning"', *Minnesota Studies in the Philosophy of Science* 7:131-193 (1975)).
92  Wilfrid Sellars, 'Empiricism and the Philosophy of Mind', *Minnesota Studies in the Philosophy of Science*, 1:253-329 (1956).

raining' in response to the presence of rain) and language-departure transitions are similarly the result of behavioural dispositions to produce non-linguistic behavioural output on the basis of endorsed sentences (e.g., to use an umbrella given endorsement of 'It's raining', 'The rain will ruin my shirt', and 'I have an umbrella to hand'). Intra-language transitions (e.g., inferring 'The ground will be wet' from 'It's raining') may be counted as genuine *moves* in the game insofar as they can be performed in accordance with rules of inference (ought-to-dos) rather than merely assessed in accordance with functional norms governing the relevant dispositions (ought-to-bes). However, that each type of transition is subject to *normative assessment* of whatever kind is sufficient to provide sentences with a unified *functional role* within the overall economy of perception, inference, and action: two sentences have the same *semantic content* just insofar as they are properly involved in the same transitions, and two component expressions have the same content just insofar as their contribution to the roles of the sentences they compose is the same.

Wittgenstein's idea that 'meaning is use'[93] is thus cashed out in the idea that the meaning of linguistic expressions consists in their functional role in an assemblage of language games unified by GOGAR, insofar as their perceptual and practical engagement with the environment can be mediated by inference. Inferential mediation is what enables us to create *concepts* – norms governing the use of words (e.g., 'electron', 'mass', 'systemic oppression') – that *represent* features of the world beyond the scope of everyday perception and action, insofar as they are embedded in systems of inferential relations between other concepts (e.g., atom/electricity, force/acceleration, society/power) that eventually lead to perceptual and/or practical consequences. The difference between these relatively abstract empirical/value concepts and the completely abstract logical/mathematical concepts that ludics aims to reconstruct is that the latter are *entirely internal* to the space of reasons, precisely insofar as their functional role is *purely inferential*. We can thus see that the semantic core of the functional roles that constitute concepts are their *inferential roles*. The crucial point is that, although the functional network of entry/exit transitions that limns the magic circle ties these inferential roles to the external world, it does not do so by associating the relevant expressions in the game with *denotations* in a model – e.g., proper names with objects (or sets of sets of objects), predicates with sets of objects (or functions from possible worlds to sets of objects), and propositions with truth values (or sets of possible worlds) – the capacity of GOGAR to represent things in the *world outside* depends on the roles its expressions play in the *world within*.

What is missing from Sellars's theory of language games is a thorough account of the *dialogical*

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93 Wittgenstein, §§30-31, 43, 120, 138-139, 197.

*interaction* between players with which game semantics and ludics are concerned. This would explain not just how disagreements between players are resolved through the process of assertion, challenge, and justification, and thus how our *beliefs* are revised by this process, but also how the *concepts* that constitute the content of those beliefs can be articulated, argued over, and amended. This is the major contribution of Brandom's theory of *deontic scorekeeping*, which sees GOGAR as a game in which interlocutors track one another's *doxastic commitments* and *entitlements*, wherein the inferential role of sentences is understood in terms of the difference they make to the *score* of those who assert them.[94] For instance, it is one thing for me to assert that 'mitochondrial DNA descends through the maternal line', and another thing for me to be justified in asserting it; but if I am entitled to this commitment, then it may entitle me to others (e.g., 'Leigh syndrome can be inherited from the mother'). Challenging me to justify my commitments is often as simple as asserting something *incompatible* with them (e.g., 'mitochondrial DNA is inherited from the father'). We are then caught in an exchange of reasons for our competing claims until we agree to disagree on one or more points, or one of us changes our minds.

The delicate balance of co-operation and competition between interlocutors in Brandom's account has both a *pragmatic* and *semantic* component. On the one hand, it is pragmatically negotiated by the collaborative maintenance of what Habermas calls an 'ideal speech situation', which draws the boundaries of the magic circle by actively excluding the interests and motivations of the players in the world beyond discourse.[95] This feeds into Caillois's idea that games are *unproductive*, and explains how competitive debate can co-operatively aim at *truth* – for as long as the conclusions of the debate can neither be manipulated nor monopolised by the victor, everyone wins. On the other hand, it is semantically negotiated by the collaborative performance of what Davidson calls 'triangulation' by interpreting one another's commitments in line with the 'principle of charity'.[96] This populates the circle with shared *objects* of discourse about which we can disagree, navigating divergences between our commitments by establishing convergences between our *perspectives* on the holistic network of inferential roles.[97] For instance, we must agree that we are using the term

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94 Brandom, *Making It Explicit*, ch. 3.
95 Cf. Jürgen Habermas, *On the Pragmatics of Social Interaction*, B. Fultner (trans.). (Cambridge, MA: MIT Press, 2001). Brandom did not discuss Habermas in formulating his theory of discourse in *Making It Explicit*, but there was a productive dialogue between the two thinkers following its publication. A useful summary and discussion of this dialogue can be found in Raffaela Giovagnoli's 'On Normative Pragmatics: A Comparison Between Brandom and Habermas' (in *teorema*, vol. XX/3, 2001, pp. 51-68).
96 Cf. Donald Davidson, 'Rational Animals' in *Subjective, Intersubjective, Objective* (Oxford University Press, 2001); 'Radical Interpretation' and 'On the Very Idea of a Conceptual Scheme' in *Inquiries into Truth and Interpretation* (Oxford University Press, 2001). A useful comparison of Davidson and Brandom can be found in I. Fergestad and B. Ramberg's 'Triangulation in Action: A Rationalizing Proposal' (in *Triangulation: From an Epistemological Point of View*, eds. M.C. Amoretti and G. Preyer (Ontos Verlag, 2011)).
97 Cf. Brandom, *Making It Explicit*, ch. 7 and 8. The crucial idea is that of *double-book scorekeeping* – a stereoscopic

'mitochondrial DNA' to talk *about* the same thing, even if our divergent commitments encode different perspectives on its inferential role (e.g., X: 'Y claims *of* mitochondrial DNA that it is patrilineal' and Y: 'X claims *of* mitochondrial DNA that it is matrilineal'). This feeds into Girard's ideas about the relation between agreement and disagreement, and suggests a way in which the syntactic account of *propositions* provided by ludics (behaviours) could be developed into a semantic account of *truth-aptness* – for the connection to objects that makes sentences into candidates for dispute is established by our ability to co-operatively map our world-involving linguistic behaviour onto that of others, identifying lexical units (locations) and discerning interactive structure (geometry).[98]

We are now in a position to look at Sellars and Brandom's account of discursive representation through the lens of Caillois's account of mimicry. The parallel is most obvious in hypothetical discourse, when we partially suspend our connection to the world *as it is* in order to represent the world *as if it were*. This suspension *forks* the game, creating a compartmentalised copy with its own scoresheet, injecting new freedoms into the derivative play-space by making certain stipulations that modify inferential roles and permit/prohibit moves. These sub-games are subject to different motivations – aspiring to *predictive accuracy* (e.g., what if interest rates fall below inflation?) or *speculative audacity* (e.g., what if there were a game where you could play with the whole of human knowledge?) – depending on the purpose of the hypothesis. The sheer range of mimetic play made possible in this way is not an aberration of categorical discourse, but an expression of its own underlying mimetic dynamics.[99] The general ability of what Huizinga would call the 'temporary world' of the game to mimic the *actual world* is manifest in the ability of these sub-games to mimic *possible worlds*. However, the parallel is most illuminating in relation to the idea that GOGAR is a meta-game. Outside of philosophy, the term 'meta-game' has been used to describe various things – from 'higher level' gaming strategies and peripheral game elements to games about games – but it has also been used to describe games which involve modifying their own rules or those of well

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take on inferential significance that tracks the consequences of a commitment both from one's own perspective (given one's own auxiliary commitments) and that of one's interlocutor (given theirs).

98  There have been a few attempts to draw connections between Brandom and Girard's work. The most programmatic can be found in Alain Lecomte's 'Ludics, Dialogue, and Inferentialism' (*Baltic International Yearbook of Cognition, Logic and Communication*, 8 (1), 2013) and the most technical can be found in Daniele Porello's 'Incompatibility Semantics from Agreement' (*Philosophia* 40, 2012). It is worth mentioning that this notion of truth-aptness corresponds to what Kant would call 'objective validity' (cf. *Critique of Pure Reason*, (Cambridge University Press, 1998), pp. 342-345), and on that basis could be related to Girard's program of 'transcendental syntax' (cf. V.M. Abrusci and P. Pistone, 'On Transcendental Syntax: A Kantian Program for Logic?' in *Second Pisa Colloquium in Logic, Language and Epistemology*, ed. E. Moriconi and L. Tesconi).

99  The intimate connection between the categorical and hypothetical is something that both Sellars and Brandom address in relation to empirical discourse. Sellars articulates this account of the inseparability of description and explanation in 'Concepts as Involving Laws and Inconceivable Without Them' (*Philosophy of Science* 15 (October 1948), pp. 287-313.), and Brandom refines this 'Kant-Sellars thesis' in chapter 4 of *Between Saying and Doing*.

defined sub-games.[100] GOGAR is a meta-game in this latter sense. However, what makes GOGAR interesting is not simply that it involves using linguistic expressions to modify rules for using linguistic expressions, but that this requires making explicit in language (rules) what was previously only implicit in practice (norms). This interacts interestingly with Caillois's insistence that governance by rules and make-believe are opposing ways of delimiting games from real life.

On the one hand, Caillois argues that the improvisation characteristic of mimicry is enabled by the roles of the players and other elements being fixed implicitly by *imitation*, rather than explicitly by *legislation*.[101] When we consider the inferential roles of linguistic expressions, it is not hard to see that the norms governing most of our everyday terms (e.g., 'kitchen', 'neat', 'run') are rarely, if ever, made explicit, and that it is only when we are dealing with technical terms (e.g., 'protein', 'superconductive', 'renormalise') that explicit rules become more important. When we consider their use in hypothetical discourse, it is not too much harder to see that our ability to *simulate* things with words originates from our ability to *imagine* them as they could be, and thus that the increasing importance of strict norms and linguistic legislation comes from using reasoning to overcome our imaginative limitations (e.g., describing those molecular dynamics within living cells for which *visualistion* is entirely inadequate).[102] On the other, Caillois argues that the improvisation characteristic of mimicry places it alongside *ilinx* with *paidia* in a chaotic ('Dionysian') alliance opposed to *agon, alea* and the order of *ludus*.[103] I have already criticised the account of rationality implicit in Caillois's *paidia/ludus* opposition, but Sellars and Brandom's work puts us in a position to realign its poles with those of the implicit/explicit and content/expression distinctions rather than those of chaos/order and creativity/constraint. GOGAR is *autoludic* insofar as it enables its own formalisation, and *heteroludic* insofar as it enables the formalisation of every other game. If it is not just *a* meta-game, but *the* meta-game of every other game, then GOGAR is the limit-case that defines *ludus,* and perhaps even *paidia* in relation to it. It thereby challenges the Glass Bead Game's claim to the title of 'game of games'.

v) The Free Play of the Faculties

We are now forced to compare the Game and GOGAR directly.

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100Cf. M. Carter, M. Gibbs, and M. Harrop, 'Metagames, Paragames and Orthogames: A New Vocabulary' in *Proceedings of the International Conference on the Foundations of Digital Games* (2012); Nigel Howard, *Paradoxes of Rationality: The Theory of Metagames and Political Behaviour* (MIT Press, 1971).
101Caillois, pp. 8-10.
102Cf. Peter Wolfendale 'The Reformatting of *Homo Sapiens'* in *The Inhuman* (MERVE, forthcoming 2016).
103Caillois, ch. 7.