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Soft Worlds: Play with Computers

I like my screwdrivers like I like my hedgehogs: sonic (computer-generated joke).¹

Alex watching Jo play the last boss battle in *Lego Star Wars* (21 May 2005):

A: It's not fair... the computer never falls off does it?

J: Of course not – it's the computer.

A: The computer knows where it's going!

Video games and virtual media are fully part of a popular children's media culture generated by commercial and public sector broadcasters and producers. They have found a place within domestic ecologies of media use, both displacing and merging with entertainment and communication media from television to telephony through mobile devices and Internet channels. They resonate with, and amplify, previously peripheral media modes and genres: from board games to game shows, from playground jokes and games to collecting and swapping cards and toys, from the topographies and quests of children's books to reality television. Imaginative and pleasurable engagement with characters, environments, stories, powers and abilities, conflicts and quests flows between the everyday consumption of books, television, films, children's play and toys and video games. These flows are now solicited in the transmedial circuits laid down by popular media and toy producers and commercial playful media universes are generated from them.

But they are also quite different. This chapter will concentrate on another tangled line of descent, that of computer technology and media. The analysis of the video game as a computer-based medium demands the description of a distinctly new set of domains and agents. The focus will be on the *computer* in computer games, on the nature and behaviours of software, on real-time

procedural operation, on simulation, interactivity and virtual environments. Games scholars have argued that video games are characterized by an ‘aesthetics of control’ (Murray 1997, Klevjer 2001). Evidently video games are ‘interactive’ media objects and as such their players exercise some level of agency in the on-screen events. However, the software that constitutes video games needs its own animate operations to be acknowledged in the dynamics of gameplay. Children and adults play with non-player characters (NPCs), artificial intelligence (AI), virtual physics and architecture, rules – but these artificial entities and processes are at play too. They respond but they also initiate – they have their own coded and autonomous behaviours. To understand the gameworlds of video game play, we need an ethology of artificial as well as human players.

Play with technology

The history of children’s play with technology is inseparable from the emergence of a commercial children’s culture, discussed in the last chapter. In the nineteenth century, both everyday and exciting new machines were scaled down to fit children’s hands: toy cars and guns, mechanical dolls and the domestic fittings and architecture of dolls houses. Educational toys and devices were popular, particularly those of scientific wonder and experimentation (optical toys such as zoetropes and kaleidoscopes) and engineering and construction. Some of these were intended for educational use, some purely for pleasure and entertainment, while others, like the home computers that would eventually follow, were used for both. The early twentieth century saw the first fantastical and modern machines of spacecraft and future weaponry – particularly for boys (Chudacoff 2011).

This overlapping of the functional and the symbolic, the mundane and the fantastical, the entertaining and the educational continues with everyday computer technology today, not least, of course, in the sophisticated toys that are the video game console and software. Younger children in particular are targeted by the manufacturers of computerized toys and devices, some like simple laptops aim to educate, others like the basic responsive robots Furby and Tamagotchi of the mid to late 1990s take more traditional toys and add mechanical life to that imbued by the child. Smart phones and tablets may also be given to small children, and there is a growing market for visual and tactile apps for a pre-school market.²

The line between (hard) toy and (soft) digital game/character is not a clear one. The nurturing of a Tamagotchi was an ambiguous activity – was the egg-shaped object itself the toy creature, or did the creature live inside it, looking out from its screen? There have been many video games since that used a similar game mechanic of attentive and repetitive feeding, and exercising, for instance, *Pokémon*, *Nintendogs* and *Moshi Monsters*. Interestingly, the human characters in *The Sims* are as much creatures to be nurtured in this regard as the cats and dogs of *The Sims Pets* expansion packs.

To date, a few particularly intense crazes notwithstanding, the virtual toys of video games have proved more successful than their actual, physical cousins. A Furby was sold on its responsive AI, its ability to learn from and communicate with its owner, yet it and other ‘smart’ toys like it were often played with as more traditional inanimate cuddly toys – switched off and incorporated into free play (Goldstein 2011, 325). The semi-autonomous nature of NPCs in many games, and the bots (software robots) of massively multiplayer online games (MMOs) such as *World of Warcraft*,³ is often at least as sophisticated as that of smart toys. Unlike smart toys whose behaviours and intelligence must stand up in comparison to the physical and social worlds in which they are situated, software characters often suggest a dynamic complexity beyond their often simple AI and repetitive algorithmic actions. As artificial agents in the artificial and ludic environments of a video game world, they are fully at home and set the terms of interaction, the rules of a game.

So, the functioning of video games is at once symbolic and technical. On the one hand, video games are toys, popular media, performative events, animated with characters and scenarios derived from established popular screen media. On the other, the analysis of video games as a computer-based medium demands the description of a special category of non-humans, software entities and agents depicted as individual characters, as collectives, or as aspects of the virtual environment itself, but all acting with a certain degree of autonomy. For instance, to play a video game is to play with, or against, artificial intelligence in the form of non-player characters and responsive simulated environments. This is a huge topic, so this chapter will identify and explore a few aspects and bodies that are most constructive in the gameworlds model. These include those that contribute to a game’s ‘worldness’, its sense of a dynamic and responsive environment however abstract in appearance. These are components that constitute the *newness* of these new media for children, entities and operations that bring to children’s play quite distinct experiences and demand quite different embodied

and imaginative behaviour within play. So, whilst a computer gameworld may overlap with or nest within a literary or cinematic world (e.g. *Harry Potter*, *The Lord of the Rings*), it and its players are quite different entities to the reader-player of the books or films. They are constituted by cybernetic feedback loops, have automata and non-human intelligent agents as playmates, all within and through synthetic and responsive playgrounds. They are part of what I will call 'distributed imagination'. Though the notion of 'world' evokes spatial dimensions, the computer gameworld may have as its underlying motive the simulation and manipulation of *time*, and of *physical forces* (friction, collision, gravity) for playful ends.

Video games as symbolic software systems have tremendous variety, from the abstractions of scale, space and objects in early arcade games such as *Space Invaders*, through side-scrolling platform games, top-down 'gods'-eye' strategy and simulation, to first-person shooters and massively multiplayer online games and back to abstraction with mobile games and puzzles. This chapter will necessarily be highly selective, referring back to the Lego Racers events, but with other examples that will draw out through comparison something of the variety and continuity of contemporary video games as cybernetic and self-acting systems.

Rules and laws

A fundamental formal difference between video games and most other popular children's screen media is that between rules and narrative. Whilst many games are framed by a dramatic scenario and enacted by fictional characters, the salient activities and pleasures of gameplay are driven by the abstractions of ludic conventions and systems engineered to sustain the flow of play or to facilitate competition and chance, puzzles and technical skill. In this regard, video games are more closely related to Snakes and Ladders than Snow White. The computerization of games changes the players' relationships to rules, however. Rules in board and card games, however strictly applied in the event of a game, can be negotiated, adapted and agreed before the game starts. They must also be learnt and understood. The game apparatus allows a variety of rule sets: limited perhaps on the Snakes and Ladders board, but with a deck of playing cards, infinite. Video games often allow a certain amount

of adjustment to settings, difficulty levels and so on but in general players cannot adjust the underlying rules significantly. In fact it is often difficult to identify the rules as such. This is in part because the software itself monitors and adjusts key variables (it keeps the score, calculates strength and health levels and so on), and in part because the 'rules' are often inseparable from the world itself: where the character can go, what powers and abilities it has, relative strengths against enemies and so on. Even physical laws, for example, gravity, collision, friction – which are non-negotiable in the actual world – are coded into virtual worlds. This difference between the player's understanding and experience of a gameworld and its structure and rules, equating the latter to the 'laws' of the world, is explored by Michael Nitsche. He explains that through the design of the code, the programmer authors the rule-based space. Players may 'generate unique permutations' but only within the possibilities allowed by the code.

Players of a video game do not look at the underlying code but at dynamically generated visual and tactile results based upon it. They look at the mediated plane and see the performance of the code. The code itself stays hidden behind elaborate virtual worlds and interfaces, and the only time one might encounter it is when an error crashes the program and a debug message points to certain lines of broken code. Players do not have to understand the logic of the code but of the mediated game world. (Nitsche 2008, 25)

Well, this depends on what we mean by 'understanding'. The player does not need to self-consciously read the code *as* code, to dig down into the layers of abstract algorithms below the elaborate audio-visual interface. But the mediated gameworld, the interface itself, is driven by the logic of the code and the player must also be driven by it. Helen W. Kennedy and I have explained something of the differences between popular narrative screen media and the processual worlds of games:

watch someone who is unfamiliar with simulation games playing *The Sims* for the first time. Building houses and naming characters is straightforward enough, but as the characters go about their daily artificial lives the tendency is to treat them as if they were real people, or at least as fictional characters who behave according to established conventions of narrative, and try to intervene accordingly. However the game's dynamics are driven by algorithms which rarely map directly onto any sense of actual (or fictional) human behaviour. (Giddings and Kennedy 2003, 160)

The gameworld's laws and behaviours, the actions it allow, refuse, and insist on are all coded. They require that the player grasp and enact their demands and possibilities via the mediated world. As we saw with the *Lego Racers*, the game encodes the players.

Interactivity and avatars

Importantly, the [...] relationship between player and system/gameworld is not one of clear subject and object. Rather, the interface is a continuous interactive feedback loop, where the player must be seen as both implied and implicated in the construction and composition of the experience. (Newman 2002, 410)

The language of cybernetics in the study of children's popular media raises questions again of agency, activity and passivity. In contrast to the positive, active connotations of the term 'interactivity', it suggests instead a mechanization of play. If interactivity is regarded as an *ideal* mode of media culture for children and adults – the triumph of human agency in technological and virtual environments – its dark flip side easily conjures up fears of everyday and psychological colonization, or even science fiction nightmares of humans controlled by machines (Stallabrass 1993). In gameplay, as James Newman notes, the player is integrated into the circuit such that media studies' reassuring separation of the entities 'viewer' and 'text,' subject and object, is fundamentally compromised. In a similar vein, Lister et al. suggest that human movement in interactive media is prompted not by 'free will' but by the game-as-system; the player is not responsible for his or her own body, a body which is 'determined to move by *being part of the circuit of the game*'. The player is acted on by the game – these are *passional* circuits (Lister et al. 2009, 398). *Communication* and *control* are inseparable aspects of cybernetic systems (Wiener 1965).

So video games are machines that articulate the visual and auditory aesthetics of popular screen media with a new 'cyborg aesthetics' in which the salient term is 'control' (Aarseth 1997, 55). This cyborg aesthetics is often most evident in the relationships between players and avatars. The avatar, as Diane Carr explains through her experience of the *Tomb Raider* games, is a machine through which the player enters into the game, and is thereby configured *by* the game:

as a player, I can do, undo and redo until Lara has effectively performed the challenge presented to her by the game, but I can only proceed through the game, through the space itself, if I perform the task as the game demands [...]

A player will systematically experiment, and after trial, error and accidental death, correctly perform the intended and necessary response. The conditional terms of our motion through space are thus rendered explicit. We do not write our own narrative, we uncover a pre-existing text and conform to its injunctions'. (Carr 2002, 174)

Game studies researchers with a background in media and film studies have applied and adapted theories of the film viewer's identification with key protagonists within a film narrative to the consideration of the gameplayer's identification with the avatar. The starting point is often the argument that the player may identify more strongly with the avatar because the player's control of the character's movements and decisions determine (depending on skill and experience) that character's ultimate fate (always within the strict limitations and possibilities structured by the game as software). Whilst this has proved a productive theoretical approach, it is limited by some significant misassumptions. One in particular is the assumption that 'control' is a linear connection, that the player has stepped through the fourth wall of the fictional/media world to become at last the hero, the protagonist, the chief pleasure now one of control over the avatar and hence the imaginary world. As Diane Carr makes clear, control is key to videogame aesthetics but it functions at least as much through acting on the player as through players acting on the world, a reciprocal configuration.

For example, it is often taken as given that psychic 'identification' in both film-viewing and gameplay is the most significant mechanism in the engagement between technological/media artefact and human viewer or player. Whilst playing with or through a favourite character offers new media pleasures, any sustained engagement with gameplay soon makes cognitive and technical demands on the player that go beyond any straightforward notion of deepened imaginative identification with the character (again this was evident with the ambiguous drivers of *Sandy Bay*). On one level there is the simple fact that playing a video game is a complex technical, cognitive and embodied feat. Initial delight at 'controlling' the avatar soon comes up against the game's demands for adequate action in steering, jumping, fighting, solving puzzles and so on. It has often been observed that players will slip between the first and third person as they account for their virtual activities. They demonstrate eloquently the shifting or intermittent nature of attention to the avatar. At times Mario is a character in the sense of a cartoon character. The player may prefer to play as Mario for reasons bound up primarily with questions of taste, preference or aesthetics. But Mario is only occasionally the game's protagonist as a film scholar might

understand the term (a *character*), more often he is, as Fuller and Jenkins have suggested, effectively a cursor, a marker or tool with which a user intervenes in software:

In Nintendo's narratives [...] The character is little more than a cursor that mediates the player's relationship to the story world. Activity drains away the characters' strength, as measured by an ever shifting graph at the top of the screen, but it cannot build character, since these figures lack even the most minimal interiority. (Fuller and Jenkins 1995, 61)

Since his early appearances in *Donkey Kong* and *Super Mario World* Mario has become a technically more complicated entity, but his nature retains something of the cursor in his mediation of player input and gameworld activity. In more recent games, like *Super Mario Galaxy*, he collects items that augment him with new, temporary capabilities and attributes. These power-ups might be figured as special costumes: a Bee Suit bestows the power to hover, a Spring Suit to jump particularly high and so on. In turn, these powers are carefully designed to allow access to new sections of the gameworld, as much a playful and temporally determined set of keys or codes as either a cursor or character. Characters rendered with the look and role of the cinematic protagonist (whether action hero or cartoon character) are, fundamentally, software entities. Solid Snake, from the game *Metal Gear Solid*, for instance, is

embodied by the player as a set of available techniques and capacities [...] In fact, it does not make sense to even talk about 'he' on-line, because there is no 'he' as distinct from the engaged player, like Lara Croft or Sonic the Hedgehog [...] on-line, 'Lara' is the player's ability to run, jump, shoot... while 'Sonic' is speed, looping-the-loop, collecting rings.... (Newman 2002, 413)

Here, then, avatars are not virtual puppets suspended before the player in the exploration of their worlds; they are semi-automata acting and performing beyond the direct control of the player (Sonic's blistering turns of speed propel him beyond the control of the player, Lara's elegant jumps and somersaults are merely suggested by the player with the press of a button). They are parts or components of the game, hybrid media-automata, entities that at once offer visual/kinaesthetic pleasure and instrumental progress through the game system by means of their programmed capabilities and limitations:

the ludic and vehicular nature of avatars is articulated with their status as symbolic objects. Again the dynamics of effect and affect are inseparable [...] much of our pleasure in the affordances of Yoda and Chewbacca in this game

[*Lego Star Wars*] lies in the articulation of the possibilities for movement and action they afford on the one hand and in the visual appeal and expectations that come with their status as both familiar media characters and Lego toys on the other. This articulation of course shifts through the rhythms of the gameplay. In the heat of a battle or the tangles of a puzzle the player may be less concerned with the appearance or intertextual connections of his or her avatar, but at other moments these factors may be primary, and at time the two will be inseparable. (Giddings and Kennedy 2008, 25)

Different games and game genres establish different connections between the game's processes and the possible actions of the player, eschewing the anthropoid avatar as mediating device. The player of *The Sims* does not control their virtual family directly, but merely attempts to direct them. Some games, such as *SimCity* or *Age of Mythology*, present multiple characters and roles to the player. The virtual people of *SimCity* are a central game element (they will riot if taxed too heavily, or if inadequately policed) yet are 'invisible'. They are an example of the profoundly algorithmic characteristics of all game entities in that they are only the interface's presentation of the effects of the interactions between a set of variables over time, variables controlled by the computer, though allowing some intervention by the player (Manovich 2001).

Gameworlds are computer systems some of which allow emergent behaviour, but only that facilitated by their always systemic, mathematical logic. The *Championship Manager* series, for example, with its emphasis on the revenue, tactics and transfers of football as a business – over the playing of matches themselves – is often jokingly referred to as 'playing a spreadsheet'.⁴ If we think of game software, then, as software, a set of tools or an environment of virtual tools and processes, rather than a fictional world, then player behaviour starts to look quite different.

...while creating a zoo for different type of *cats* (e.g., tigers, lions, and leopards), Rachel learned of a new birth in her zoo and responded by selling the newborn animals immediately [...]

1. Rachel: Yeah, because the baby – um because there was a birth of an endangered animal? <...> that's really great. And it's especially great for me because I can sell the little baby for \$1000. [Clicks button to sell baby.] That's a good deal.

2. [Rachel pauses, then explains herself.]

3. In real life? I would not own a zoo like – I would not, um, what would – what would you say, um, manage a zoo like this. I would be much more caring. But in this game, [smiles and nods her head] I'm more (.) greedy. But that's okay.

Okay, so now that I have more money, I actually can (.) that's really good. Except it will go very quickly. (Stevens et al. 2008, 59–60)

In a study of the entertainment and educational ecologies of children's video game play, Reed Stevens, Tom Satwicz and Laura McCarthy followed two girls' differing approaches to the simulation game *Zoo Tycoon*. They note a complex set of relationships between the girls' cultural experiences and tastes, and the laws and dynamic structures of the game, resulting in distinct play events that cannot be reduced to either. One of the girls, Katarina, enjoyed decorating her bedroom, making lamps and designing websites for school projects. Rachel, on the other hand, led a very busy life that required an efficient organization of school, homework, church, sport, babysitting and social activities, all carefully set out on a calendar. Katarina's enthusiasm for design, the researchers note, was clearly connected to her behaviour in the gameworld, as was Rachel's 'preference for efficiency'. Simulation games such as *Zoo Tycoon* are often open enough to allow the development of a visually attractive virtual environment as a player's main aim (Katarina), or conversely, the coordination of a well-organized world maximizing growth and other economic gains (Rachel).

Katarina and Rachel arrive at zoos that look and function differently [...]

We found that Katarina played the game to 'design' and reported that she learned what she called 'design methods'. Rachel played to efficiently beat scripted scenarios given by the game. Whereas Katarina sought to make her exhibits 'pretty', Rachel arranged her exhibits for best functionality rather than aesthetic appeal. (Stevens et al. 2008, 59)

Though often referred to as 'sandbox' games, these worlds do not have the freedom and plasticity this implies. Katarina's aesthetic approach, if pursued without attention to her zoo's business operations, risks economic failure. For instance, she spent her in-game funds on trees and rocks and only the minimum on feeding and caring for the animals. These game systems are more virtual economies than a translation of an actual toy zoo. Unlike the more open construction possibilities of, say, *Minecraft*, most simulation games have a carefully balanced set of environmental and economic laws to constrain possible actions for ludic ends. Play in both *SimCity* and *Zoo Tycoon* is sustained by the need to gradually accumulate resources to expand, develop or ornament the gameworld. So, whatever aspects of the players' taste, imagination, or sense of self and identity are mobilized in video game play, their behaviour in the gameworld is always transduced by the code.

This inevitable process of transduction across actual and virtual play is neatly illustrated by the technologically mediated morality of the 'cheat code'. Simulation games always contain these more or less hidden 'cheats', embedded codes that allow the player to generate infinite funds bypassing the 'preferred' gameplay route of gradual and skillfull accumulation.⁵ Rachel chose not to use cheats, a decision apparently driven by both virtual play preference and her actual world moral order. The rejection of cheats reflected 'her overall orientation to life and game play', and once she had tested out the game as a system, she chose instead to abide by the rules and their implied morality and 'clearly sanctioned modes of improvement'. As Rachel herself put it,

Before I did the scenarios I definitely used the cheats a lot...the money cheats...for the scenarios I feel like – I don't know. When I was doing more free games...the thing that would get in your way of having a really nice zoo was not having enough money. So in the scenarios I try to – I don't know, work harder at being better. (Stevens et al. 2008, 56)

Katarina on the other hand 'was so unwavering in her focus on using the game as an aesthetic design medium that she actively occluded in-game instructions that recommended efficiency and point-maximizing behaviors', and had no qualms about using cheats to ensure the survival of her zoo (Stevens et al. 2008, 55).

To reiterate, I would argue that what we are seeing here is not a straightforward playing out of children's own personalities and fascinations as assumed in the therapeutic world-building of actual sand play (Lowenfeld 2008 [1935]). There are complex relationships between these girls' senses of themselves and their behaviours in the game. The game is not a virtual tabula rasa on which to project an identity, rather a playing out of certain expectations and preferences through choices in the game, and the directing of those preferences into its algorithms and economies. Rather, these are loops through which the gameworld as a computer system modifies and regulates cultural and subjective preferences, imagination and creativity according to the logic of an economic and behavioural simulation. The game event is a cybernetic system in which the actual, biological, lived-cultural and the mathematical, artificial and ludic circulate and shape, govern and exercise varying degrees of control over each other. It works on, shapes and extends imagination and identity, distributes them around a network of human and non-human bodies and processes.

I'll return to this notion of the cybernetic in particular as constitutive of everyday gameworlds later in this chapter. In the meantime, I will continue with related questions of agency and action within and around virtual worlds.

Lively worlds

The computer-generated environment of a video game in its entirety is an animated virtual playworld. By concentrating on the avatar we might miss the active, agential nature of the gameworld too, all generated by the same software engines, rendered with the same polygons and texture maps, ascribed behaviours and affordances. Players can manipulate a game's topography (*Super Monkey Ball*), or construct it (*The Sims*, *Little Big Planet*, *Minecraft*). In more abstract games, there is no clear symbolic distinction between environment and characters (*Tetris*, *Minesweeper*). We have already explored something of the world of Sandy Bay, its ludically motivated landscape and physics. As I have hinted earlier, to play a video game is often to play with the whole gameworld as a system.

Gameworlds are virtual polities as well as virtual geographies: as Rachel and Katarina implicitly recognized, they simulate social and economic systems. The society and economy might be explicitly figured as a gameplay motive – in *The Sims*, *Zoo Tycoon*, *Animal Crossing* – or they may be similarly integral to the game mechanic but adopt a different frame of reference. To play any game that involves the accumulation of points, coins, rings and their expenditure for survival, items, power-ups and so on is to be subject to a virtual economy in all but name.

Perhaps the most significant – but rarely studied – feature of video game worlds as virtual media is the strange socialities they generate between players and artificial intelligence and non-player characters. Artificial intelligence is perhaps the most commonly understood instance of simulation as autonomous agent in digital games. In a game AI generally refers to the components of the program that respond most sensitively to the actions of the player. The term covers both the coding of the behaviour and responses of NPCs and the overall sense of the gameworld as a system that is responding convincingly to the player's engagement with it. Generations of children have grown up playing with automata, software robots, whose behaviours are driven by the application of AI to entertainment. This 'expressive AI' is about

creating a sense of aliveness, the sense that there is an entity living within the computer that has its own life independently of the player and cares about how the player's actions impact this life. (Mateas 2003)

In some applications of AI to playful media, such as smart toys or chatbots, the artifice is unavoidable and prompts ontological reflection on the nature of life

and reality. Sherry Turkle's research with computer toys from the late 1970s illustrates this: she found that children playing with computers and interactive toys were also playing with their understanding of machines' agency and intentionality. An interactive toy that seemed to anticipate the child's moves or strategy would be angrily accused of cheating, for instance. A nine-year-old girl with some experience of programming compared the vitalism of television and computers:

'The television set isn't alive. It doesn't make up its picture. It only passes it on.' A person, she explains, might have to tell a computer how to make a picture, but the picture doesn't exist in the world before the machine gets involved: 'The computer has to know how to do it. To make it up.' This reasoning leads her to a special kind of verdict for the computer: 'It's sort of alive'. (Turkle 1984, 41)

This *sort-of* life resonates with all the *sort-of* realities of play, games and the virtual: in her instrumental engagement with heterogeneous entities in her world she has established a practical variegation of agency and autonomy, rather than the binary opposition of human subject and non-human objects (nature, technologies) that has structured Western thought since the Enlightenment (see Lister et al. 2009, 277–280).

The sense of aliveness or intelligence (or at least the sense of plausible behaviour and responses) of NPCs seems to require a much lower degree of sophistication or realism than that expected of chatbots, smart toys and other more serious AI applications. Within the stylized gameworld, and when put to playful ends, automata can seem perfectly acceptable in their animated artifice. An influential essay by the philosopher Daniel Dennett offers productive ways of thinking about the imaginative/pragmatic relationships between human and non-human players. Taking a chess computer as his example, his argument runs as follows: the strategies of a sophisticated chess machine are so complex that they cannot be predicted by a human player. Even the programmer couldn't say what sequences of moves it would make in a particular game. Hence, it is only possible to play chess with a chess computer by ascribing *intentionality* to it, by reacting to it as if it were an intelligent player:

when one can no longer hope to beat the machine by utilizing one's knowledge of physics or programming to anticipate its responses, one may still be able to avoid defeat by treating the machine rather like an intelligent human opponent. (Dennett 1971, 89)

This is the 'intentional stance', and Dennett distinguishes it from the 'design stance' in which a detailed knowledge of how the computer or program is

designed would allow the designer (the user or player) to predict the system's response to any input or operation. In the case of chess, the design stance would entail the player knowing enough about the instructions coded into the game-as-program to definitively predict every move the computer would make (Dennett 1971, 87–88). Yet,

on occasion a purely physical system can be so complex, and yet so organized, that we find it convenient, explanatory, pragmatically necessary for prediction, to treat it as if it had beliefs and desires and was rational. (Dennett 1971, 91–92)

Dennett offers this concept as a practical, pragmatic way of understanding the operations and agency of complex systems that at once acknowledges the very palpable (and perhaps unavoidable) sense of engaging with a system as if it had desires and intentions, whilst rejecting naïve or idealist versions of anthropomorphism:

The concept of an Intentional system is a relatively uncluttered and unmetaphysical notion, abstracted as it is from questions of the composition, constitution, consciousness, morality, or divinity of the entities falling under it. Thus, for example, it is much easier to decide whether a machine can be an Intentional system than it is to decide whether a machine can *really* think, or be conscious, or morally responsible. (Dennett 1971, 100)

So this intentionality does not assume that complex systems have beliefs and desires in the way humans do, but that their behaviour can, indeed often must, be responded to *as if* they did. Or perhaps, and Dennett hints at this, their 'beliefs' and 'desires' are not so much metaphorical as analogical. The intentional stance usefully sidesteps the speculative cul-de-sacs of arguments over machine consciousness and allows an ethological attention to what complex systems, in this case software, actually do: what behaviours they exhibit, what effects they have.

This 'unmetaphysical' notion of the intentional system both resonates with Latour's non-human delegations and suggests ways in which we might theorize our material *and conceptual* engagement with complex computer-based media. It might suggest why children interacting daily with artificial intelligences and autonomous agents in video games do not seem to reflect so deeply on the ontology of their playmates as did the players with early computational toys observed by Sherry Turkle.

To give a simple example from a more recent computer game form, the player of a first-person shooter (FPS), such as the *Call of Duty* series, must respond to the behaviour of the enemy NPCs as intentional. These automata 'want' to kill

the player's avatar and avoid being killed themselves. Metaphysical reflections on the nature of machine intelligence are neither here nor there: in the gameplay moment the enemies move, target or evade as intelligently as their limited but effective range of behaviours requires.

Mateas cites the behaviour of the ghosts in *Pac-Man* as a foundational moment in the development of expressive AI. The ghosts do not simply hunt down the avatar as quickly as possible, which would be easy to program but would result in a very limited game. Rather, each ghost has its own simple coded behaviour. One chases Pac-Man directly, one is directed to a point immediately in front of Pac-Man and so on. In addition they attack in waves, gradually attacking more often. Individually none of them is a particular threat, but the combination of simple behaviours generates a non-linear and dynamic ludic environment. The ghosts' AI must be both complex enough to deny the player a 'design stance' – the ability to predict their movement and so easily avoid them – and controlled enough to facilitate an exciting game:

This behavior must challenge the player without being impossibly difficult, and be unpredictable enough to make the ghosts feel alive and responsive to the player's activity. (Mateas 2003)

It is not only individually figured characters that must be ascribed intentionality but also 'intelligences operating behind the scenes'. For example, the player of a real-time strategy game (RTS) might 'sense' the presence of the enemy commander – or even the game as system itself – in the actions of computer-controlled troops. In this case we are closer again to Dennett's chess machine; it is not the knights and pawns that are played against as an animate entity, but again the computer system itself as player, the one that makes the *Lego Racers* go.

From the uncomplicated but highly effective behaviours of Pac-Man's ghosts, the tactical behaviours of military units in *Advance Wars*, to the convoluted conversational exchanges of the citizens of *Animal Crossing*, everyday play is now populated with simulacra. The initiation, prediction and anticipation of – and reaction to – the behaviour of software entities (called 'intelligent agents' in less playful computer systems (Wise 2011)) are quasi-social and technical practices now are fully embodied by young children.

If contemporary video games appear to leave little space for immediate reflection on the life or intelligence of the game characters, this is due in part, no doubt, to the intensity of attention and reaction demanded by action-driven games – there simply isn't the time. It may also be due in part, as

suggested earlier, to the mediation of the NPCs through their unnatural ecology – that is they are more at home in the *sort-of* world of the game than entities such as Furby are in the actual world.

Regardless of whether children reflect on the virtual life in their play or not, as players they must – to play the game at all – adopt the intentional stance and ‘engage the machine intelligence as machine intelligence (rather than as a pretense to human intelligence signified by the avatar simulacrum of a human...)’ (Simon 2007, 168). The player must accept the automata as sort-of alive, credit their non-human behaviour with a level of logic or intentionality entirely appropriate for the task in hand. Often this is simple enough in principle, if trickier in action – avoiding, again, the FPS enemies for instance. Sometimes the player must try to work out in more detail what the enemy might do, what its encoded behaviours are. In the more strategic FPS *Call of Duty 2*, Bart Simon points out, survival on the cinematically rendered D-Day landings relies on understanding and working with the behaviour of the computer-controlled comrades:

It becomes clear after dying the umpteenth time that sussing out the mechanics of the coop AI is crucial; you must move as a group, you must wait for cover fire, you must protect your mates, etc.... There is almost no dialog here, your comrades do not pretend to be able to hold a conversation in the trenches, instead there is what I call a ‘conversation of actions’ and the increasing recognition that you must keep ‘face’ with the AI in order to effectively play and make meaning of the game. (Simon 2007, 168)

Simon’s account could be considered a playful, experimental ethnography of a synthetic society, a society that is uncomplex and singular in its relationships, behaviours and goals, but still dynamic and reactive. Detailed description of it as a social group or event highlights the profoundly machinic strangeness that underlies the photorealistic imagery:

In one epic scene you are a Russian private storming a German held railway station in Stalingrad. You begin the scene crawling through pipes on your own and drop down into a room full of comrades in a fire fight. There is a sense that they know what’s up and you take a moment to get your bearings then you move and a group breaks off to follow you. Depending where and how fast you move your comrades will take up positions nearby. If you move too far too fast you are on your own. You cannot direct the troop with menu commands (you are not in control in that sense) rather you must in a sense spend some time learning the algorithms that govern the movements of your comrades. The action is meant to be cinematic and thus a re-mediated Spielberg experience

[clearly capitalising on recent popularity of *Saving Private Ryan* and its visceral beach-landing scenes] passing itself off as realistic but that feeling is mitigated by the strange inhumanity of your comrades... they don't speak, they do not appear as individuals, there is an endless supply of them. And yet, they act. They act on behalf of an AI module just as your avatar acts on behalf of you. The AI is tracking you and modifying its avatars' actions and you must learn to track it. This mutual tuning is done through action in the game, a *conversation of actions*; and once you find the rhythm combat is a cinch and the feeling when combined with uplifting music is euphoric. (Simon 2007, 168)

Simon compares software chatbots and their attempted simulation of human conversation – and the derision they receive – to the often very technically limited 'AI' of games (often simple dialogue trees). The game structure, trajectory and abstractions facilitate an ease and naturalization of conversation (and conversation of actions) – the non-human nature of these soft playmates is accepted as part of the flow through the synthetic, conventional gameworld:

Coop AI opens up the field of exploration in a way that Turing test driven competitive AI has all but shut down. (Simon 2007, 169)

The *Animal Crossing* series of video games for various Nintendo consoles illustrates beautifully this opening up of cooperative AI for play. It also invites reflections on the temporal or durational dimensions of virtual gameworlds. Though very different in appearance, pace and gameplay from an FPS, like the FPS the 'social' world as a ludic event is entirely bound up with speed and rhythm. As a resident of a small village populated by animals, the player must, over days, months, even years, build and maintain relationships through conversation, buying and selling items and exchanging letters and gifts. Everyday interactions are rarely dramatic, often just a simple exchange of pleasantries. The player communicates through the selection of a question or response provided by the game as short lines of text. This minimal conversation may at times intervene in a significant event in the game, or it may simply be – like so much actual everyday conversation – an affectual exchange, phatic communication to sustain relationships and 'community'. An example of the former is when an animal tells the player's character that they are thinking of leaving the town. The player is given two or three options in a simple dialogue tree, generally a plea to stay and one or two degrees of indifference. The appeal to stay will generally result in the animal's pleased surprise that the player's character cares so much and an emphatic decision to remain in town. It is not clear whether the general 'shooting

the breeze' chat has any instrumental role in maintaining the general happiness of the animals, but the game strongly suggests that it does, and it seems to feel like it to the player.⁶

Virtual time

Late December 2008, between Christmas and New Year, a liminal hiatus in the hard work of festivities. I'm waiting for a knee operation and can't walk far or drive so we are mainly stuck indoors. We spend much of our time in a series of virtual worlds.

Alex, Jo and I are in the lounge. Alex is playing his 'file' on Jo's *Animal Crossing: Let's Go to the City* on the Wii, Jo is playing the latest *Pokémon* game on his DS, but helping Alex when needed. I'm intermittently playing *The Legend of Zelda: Phantom Hourglass* on my own DS. The boys go off into the other room for their tea (I can't help their mother much, so she is the only one not playing). The *Animal Crossing* game is set to 'pause'. Its background music tinkles away quietly, an animated sheet of house symbols scrolls endlessly and impossibly smoothly in the flat background, whilst a ticker-tape message slides past horizontally, pointing out – to no-one – that connection with the wiimote has been lost. I'm stuck in a labyrinthine level of *Phantom Hourglass*, and because of my knee, I cannot sit at a desk and check an online walkthrough on my laptop, so my gameworld too is paused, on 'powersave', animation suspended. Alex sticks his head round the door to check the clock on the mantelpiece. He has been invited to visit by Rod, one of the animals in his village, at 5.45. As the gameworld is synchronized with the actual time – virtual time ticks away even on pause – Alex doesn't need to check the game itself. He has time to finish his tea before restarting.

Gameworlds unfold in virtual time as well as space, and their temporalities find rhythms with those of the mundane world just as virtual space interpenetrates everyday space. Game systems manipulate time in diverse and exotic ways to fit or drive gameplay. A game of football in *FIFA 13* looks very much like the (televised) real thing but the 90 minutes of the actual game – displayed on the screen – flies by as players choose its duration (between two and ten minutes for each half). A turn-based strategy game, such as *Advance Wars*, has infinite patience when it is the human player's turn to deploy military units, whereas a real-time strategy game has its impulsive temporality writ large in its name (see Juul 2004). Sonic the Hedgehog famously faced the player and scowled,

tapping his feet, if not immediately driven through his loops and platforms; other games have time limits to levels, or NPCs that will act on the player's avatar if it does not act itself. Whilst early adventure games would remain completely inactive between moments of human input, later games – particularly simulation games – once started will blithely play themselves until further human input is received.⁷ Time in *SimCity* or *The Sims* can be set to fast-forward as decisions in the modelling of economies and behaviours are tested in imaginary time. Most games can be paused, or frozen at a save point, to be reanimated later.

Animal Crossing's charm and gameplay are predicated on its simulation of real time.

Amelia (an eagle), asks Joey (Jo's avatar in *Animal Crossing: Let's Go to the City*) to take a present to Aurora (a penguin) by 3pm.

S (checking my watch): You've got 20 minutes then.

J: No, here it's 25 to...

The game is set to the internal clock of the video game console, so – if the console clock is set correctly – night, day, seasons, festivals and birthdays are marked throughout. Alex was allowed one year to stay up until midnight on New Year's Eve to see the celebrations in his *Animal Crossing* town. He was barely awake when the virtual townhall clock finally struck twelve (about five minutes before the explosion of noise in the actual street outside, suggesting virtual and actual time were slightly out of sync). A small group of animals gathered before a 'Happy New Year' banner, were addressed by the tortoise Mayor and watched a firework display. It looked anti-climactic to me, but Alex went to bed satisfied he had attended a real event.

The clock and the world's temporality in *Animal Crossing* are completely integral. The clock isn't a measure of time, but virtual time's arrow itself, driving forward the events, economies and relationships, not just ticking along beside them. The game has some elaborate measures built into its fiction to avoid temporal paradox, manipulation or collapse. For example, in the 3DS version, *Animal Crossing: New Leaf*, the player can buy turnips once a week from a boar called Joan. These can then be sold at a profit later in the week (the player must check the turnip prices each day – that is every actual day of the week – to determine the best time to sell). A player could quickly build up funds by repeatedly resetting the world's clock to effectively 'fast forward' from Joan's arrival to the optimum market conditions. However, the gameworld's artificial–

natural laws foreclose this market manipulation and, as Joan explains, if the clock is changed, the turnips immediately rot and cannot be sold.

Animal Crossing's temporality is integral to its social and economic systems too, which are in turn the basis of its gameplay:

The game design intentionally draws on the passage of time to create both emotional resonance and economic value in the gameworld. (Kelley 2007, 181–182)

The game is a virtual economy through which natural resources, commodities and affects flow. The player gathers natural resources for exchange for currency ('bells'): fruit, shells, insects and fossils are shaken from trees, beach-combed, caught in a net or dug out of the ground. Though the buying and selling of furniture, ornaments and natural resources in a series of little shops gives the impression of an economy of mercantile capitalism, it is in effect a simulation of pre-capitalist *symbolic exchange* in the anthropological sense. Rather than accumulation for its own sake, exchange here follows the logic of a gift economy (Baudrillard 1993, Mauss 2002 [1950]). Animals ask a favour (to supply an apple or a particular type of fish) and then reward the player with an object (an item of clothing, furniture or ornament), or they often respond to a visit or kind word from the player with a gift. Both pleasantries and objects flow between characters, cementing relationships and the virtual community. The bells accumulated by the player from these transactions are either fed back into the community through public works (park benches, bridges) or are spent on personal adornment or on enlarging and decorating the player's house, in an odd mix of municipal socialism and potlatch performativity.

The circulation of affect is not constrained to the virtual world. Happy animals – who often sing and dance when especially pleased – delighted Jo and Alex, for example, when the boys had remembered a character's birthday (again in actual time, once a year) and visited its house with a present. Conversely, Jo once inadvertently opened a present he had been asked by one character to deliver to another and was upset almost to tears by the donor's angry disapproval.

This is an economy driven primarily by affectual circulation– gift-giving, deliveries, writing and posting letters, short pre-rendered and often surreal conversations with non-player characters – the collusional flow and circulation of virtual objects initiating and sustaining relationships (and actual-world emotions) through exchange and gifts, flattery, the coining of new nicknames

or characteristic greetings, delivery of presents for others, the finding of lost items. And gifts are –as anthropologist Marcel Mauss would approve – always reciprocated.

Everyday cyberculture

Theoretical work on digital culture in the late 1980s and 1990s dramatized the future potential and import of emerging new technologies and media of VR and computer-mediated communication (email, bulletin boards, playful spaces such as Multi-User Domains) through a technological imaginary inspired by science fiction, and in particular the subgenre of cyberpunk. My descriptions of contemporary digital culture as cybernetic, virtual, simulacral, as intense intimacies between the human and the machine, echo this rich body of ideas. However, my descriptions in this book are neither futurological nor of an imaginary order. Contemporary virtual and networked media events are cybernetic, simulational even if utterly mundane: to play in the whimsical cyberspace of *Animal Crossing* or the persistent virtual server-worlds of *World of Warcraft* is to actualize William Gibson's famous fictional dataspace. As the futurological frenzy that attended cybercultural studies evaporates, it is important to note that it is now quotidian reality.

Like the virtual, the 'cybernetics' of cyber-culture is often used in a vague way to denote media and behaviours in and through digital networks. Here I want to insist on the importance of its precise uses and history, particularly as conceptualized by Norbert Wiener as the circuits of feedback of information and control within systems, where systems might be within a machine (e.g. a steam engine or computer) or might consist of machines and humans or other animals (Wiener 1965 [1950]). I will also touch on Gregory Bateson's subsequent synthesis of cybernetics, psychology and anthropology for thinking about systems beyond those contained within the black or beige box of the game console (Bateson 1972).

In their influential and encyclopaedic book on game design, Katie Salen and Eric Zimmerman devote a chapter to games as cybernetic systems. A cybernetic system, they explain, contains three elements:

a sensor, a comparator, and an activator. The sensor senses something about the environment or internal state of the system. The comparator decides whether or

not a change to system needs to be made as result of sensor's reading, and the activator activates that change. (Salen and Zimmerman 2003, 218)

This simple model might be of a closed system, monitoring and modifying its own internal state, or it might be part of, and interacting with, a larger system. Thermostats in a central heating system are a commonly used example. The thermostat senses a room's temperature, compares it to its settings and activates a change when the settings are reached (i.e. it turns off the heating when the preset temperature is reached). A computer gameworld is built from units of this simple triadic logic:

As a cybernetic system, the rules of a game define the sensors, comparators, and activators of the game's feedback loops. Within a game, there are many sub-systems that regulate the flow of play, dynamically changing and transforming game elements. (Salen and Zimmerman 2004, 218)

A gameworld can be thought of a system, but it is one itself made up of interrelated subsystems. These subsystems might control a particular relationship or behaviour, but are always connected:

A cybernetic system within a game that directly affects just one component of a game will indirectly affect the game as a whole'. (Salen and Zimmerman 2004, 218)

They give the example of a cybernetic feedback subsystem engineering an optimum play-state in racing games. The futuristic racing game *WipeOut* tracks the speed and ability of the player through the behaviour of the virtual vehicle and adjusts the speed of the computer-controlled hovercars accordingly. A racing game where opponent cars disappear into the distance or where they are left standing is no fun (unless of course, as we've seen, other games can be improvised), but a cybernetically modulated cluster of vehicles just fast enough to present a challenge is. In the *Mario Kart* series of games (particularly popular in our house), this cybernetic levelling out of the differentials of skill and luck is effected through the targeting of power-up items according to the players' (human and computer-controlled) position in the race. The leader will, as he or she bashes through a power-up box on the track, collect a green shell, a kind of unguided missile and the least powerful item in the game. There is a range of devices and powers worthy of Acme Corp. in a Looney Tunes cartoon to be collected – according to the kart's position in the race, down to the 'Bullet Bill' which the player in last place may, occasionally, receive. For ten seconds or so

the kart is transformed into a large, fast invincible missile with painted teeth like a Spitfire. Acquiring one of these towards the end of a race can shift the driver from last to near first place. It is a colourful and witty animation of power and action, but serves an underlying cybernetic principle of system regulation put to ludic ends. As Grahame Weinbren puts it,

The point of the game [...] is to keep the player between two frontier zones – on the verge of mastery, on the verge of losing control [...] The pleasure is in overcoming what was just a few minutes ago insurmountable. (Weinbren 2002, 183)

The gameplay experience is a carefully designed experience, one that is achieved only when the human player accepts, learns, trains for the machine's demands. It is a tightly engineered circuit.

Computer and video games, then, are cybernetic systems for popular entertainment, 'communication systems where the functional differences among the mechanical parts play a defining role in determining the aesthetic process' (Aarseth 1997, 22). For Aarseth, a cybertext

shifts the focus from the traditional [media/literary] threesome of author/sender, text/message, and reader/receiver to the cybernetic intercourse between the various part(icipant)s in the textual machine. (Aarseth 1997, 22)

It also complicates any simple conception of interactivity as a two-way flow of action and reaction between a human and a computer application, a player and a game. It multiplies the agents at work in part by breaking these agents down into their components.

This control over gameworld information, reminiscent perhaps of the detective novel's careful timing of revelation, is integral to many games, and hints at the autonomous 'intelligence' of the system as experienced in play. The player only sees or knows aspects of the gameworld, its algorithmic operations and coded totality are fully known only to the system itself, and revealed only partially. Sometimes this is ignorance of the precise systems of causality (as in *Animal Crossing's* relationships), in other more expansive games it is spatial, that is the player can only see and interact with the area of the gameworld they are currently in. In many games, from the early arcade game *Defender* to real-time strategy games such as *Age of Mythology*, adventure/RPG games like *Legend of Zelda* and MMOs like *Guild Wars 2*, this lack of knowledge is integral to gameplay, requiring a restless exploration of

labyrinthine dungeons, or perpetual vigilance and reconnaissance as enemies spawn and gather strength in remote regions.

The video game (and to varying degrees other software applications) not only configures its player through the technical possibilities and constraints inscribed during design and manufacture, but it is also designed precisely to configure its player continually during play itself. Gameworlds and temporalities, modes of presentation, puzzles and combat, engagement with computer-controlled characters are all constantly impinging on the player's experience and responding to the player's responses. Each different game, and each different playings of any particular game, rigs up different connections and circuits and demands different states and different pleasures – visual and audio cues, spatial conventions, embodied memory, the cognitive intensity of puzzle solving and the interludes of visual pleasure or calm. And far from offering the player a virtual world within which to exercise his or her interactive mastery, they invert this agential relationship: the game generates and navigates its world, the player is prompted to respond. The player's sense of intense agency in the gameworld is not illusory, but it is circuitous rather than initiatory, exercised through simple signals to be processed in synthesis with other subsystems: a twitch of a thumb on a tiny button triggering dramatic screen action is, in cybernetic terms, an *amplification* by the circuit.

Control aesthetics: I'm the one who makes the Lego Racers go

To tease this out a little further I will use it to revisit the Lego Racers events. Firstly, the interplay between the children's pleasure in the animated mini-figures and the virtual building of cars demonstrate this assertion that a computer gameworld must be understood as a cybernetic system put to the service of playful media, processing and articulating both interactive control and popular media aesthetics. Secondly, I will suggest that this machinic play produces a distribution of imagination particular to computer play.

Video games configure their players, in real time, a moment by moment, movement by movement, response by response anticipation of behaviour. Ludic futures are built into the game, from simple forking paths of early text-based adventure games to the dialogue trees and AI of contemporary games. The videogame event is the relationship between its components (human and non-human), its motive is the ludic ambiguity of its capacities and characters. Jo's

exploration of the geography, physics and pathology of Sandy Bay, and the new little games that emerged, might seem to promise a victory of straightforward human and imaginative agency over the system. But this exploration only *stretched* the logic of machinic configuration of the player; it did not break it. Jo was testing the game's systems (literally bouncing off the gameworld's limits), and all the while the game was patiently waiting for its prodigal to return to the preferred performance of successfully racing the computer-controlled cars. Emergent play could only open up so much of the gameworld, whereas the rewards – of progression through levels, of spectacular or narrative revelation, of new capabilities and affordances – are reserved by the game for such time as the player decides (or learns) to play *the* game. That is, we never got beyond Sandy Bay – in the virtual world at least.

Some of the improvised mini-games emerged from a simple assemblage of animated image, and behaviours encoded into avatars and vehicles. Crashing the car and losing bricks repeatedly will eventually leave the player with just the Lego man. The boys found the sight of the Lego man hilarious, running up and down hills as fast as his barely jointed legs would carry him – a kind of real-time, interactive cartoon.⁸ Later, Jo would test the water-death boundary again, nudging the mini-figure deeper and deeper until all but the very top of his baseball cap was below water and he 'drowned'. Even just running the little car-less driver around seemed to resonate with the drowning games and other testing of limits between game life and death:

J: It's funny how he dies, isn't it?

J: I wonder how he dies?

If the concept of 'identification' has any purchase in these boys' imaginative engagement with the gameworld, at best they seemed to slip between a number of 'identifications': being the virtual Lego men whilst playing the computer game; but being the virtual Lego car itself (as we might imagine a child playing with a conventional toy vehicle to be); a hybrid of the two – a virtual car/driver; being the constructors of these men, cars and car-men; being at once the child playing with the actual Lego car-men and coextensive with the car or car-men they are propelling around the room; being the player of a video game and being a meta-player; then deferring the (ultimately passive) role of meta-player to the adult observer and his pretend keyboard. Rather than identification, then, this is a mode of imaginative play that slides around momentary positions of agency, of control and being controlled: a circuitous becoming. When Jo refused

to write his name on the paper signing-in screen because he was 'the one who makes the Lego Racers go', he was not taking an imaginative position outside the gameworlds, god or king-like, not even the computer itself. He was positioned or disposed by the game event's transductions of agency of which he was an integral part. He had to be an agent, but not the player (delegated to another human component) or the avatar (he was still driving the car/driver avatar). The game system is the only agent left. An imaginative event was, therefore, configured by a real relationship between agencies and entities. In the virtual game, Jo was playing *with* (and played *by*) the whole gameworld/system, in the actual game he was playing *as* the gameworld system: not one character within a screen fiction, but rather the whole universe that makes the Lego Racers go. He was in the circuit, was the circuit. Imagination was at work, but it is not the familiar imagination of 'let's pretend'. If we can talk of ecosystems of distributed cognition in psychology (Hutchins 1995), then in this event, and in other events involving virtual media, we are seeing *distributed imagination*.

The events in and around Sandy Bay are tiny instances of what is now a very ordinary and everyday cyberculture. All sorts of genres and imaginaries are built into and played out of video games: military, domestic, cute, fantastical, managerial and so on. Cyberpunk is now just one, and a relatively niche taste at that. Instead, we have the intense and intimate circuits of human and machine played out daily in bedrooms, on mobile phones on the bus and so on. Now the cyborg is mundane, the microethologist needs to be careful not to miss the marvellous within everyday technoculture.

Sandy Bay, in both its virtual and actual aspects, should also remind us that systems, whether ludic or machinic, are never closed. As Gregory Bateson explains, whilst systems such as steam engines, societies and computers can be studied or described as closed circuits, formed from internal 'chains of causation', they are never completely closed off from their wider environments. This 'second order cybernetics' insists that systems are always open. In physical terms, and the laws of thermodynamics, systems must be energized from an external source and lose heat to the outside; but also, and more importantly for understanding the cultural-ecological operations of systems, 'events within the circuit may be influenced from the outside or may influence outside events' (Bateson 1972, 404). The next chapter will explore further the eccentric loops between play, imagination, technologies, media images and bodies, moving out from the virtual gameworld, but still concentrating on the play between the material and the immaterial.

Notes

- 1 University of Edinburgh research project on unsupervised computer joke generation. 'Natalie Haynes's Brave New Algo-World', BBC Radio 4, Wednesday 8th January 2014, <http://www.bbc.co.uk/programmes/b03nt9vk>.
- 2 In their multimedia flexibility and ludic affordances, smart phones and mobile devices are toys for older children and adults too (see Lister et al. 2009, 252–253).
- 3 Though probably not an issue for most WoW players in the age group covered by this book, there have been legal challenges by Blizzard, the game's designers, to the external production of software bots that automate key aspects of the game for players, such as resource-gathering and fighting. These are games that can play themselves, <http://news.bbc.co.uk/1/hi/7314353.stm>.
- 4 *Championship Manager* is not the only game that aestheticizes the spreadsheet. '*SimCity 4* was literally prototyped in Excel. There were no graphics – it was just a bunch of numbers – but you could type a code that represented a particular type of building and the formulae built into the spreadsheet would then decide how much power it had and how many people would live there'. Interview with *SimCity* lead designer Stone Librande, <http://v-e-n-u-e.com/Sim-City-An-Interview-with-Stone-Librande>. Accessed 12 February 2014.
- 5 Often written into the game code to allow the designers to be able to test the game whilst under construction, 'cheats' have been a fundamental aspect of game culture since the first home computers (Haddon 1994, Consalvo 2007, Kücklich 2008).
- 6 The animation of toys, objects and environments seems intrinsic to the psychic dimensions of children's culture from the magical living objects of fairy stories and the animation of toys in play to game avatars and virtual pets. There must be a connection with D.W. Winnicott's theories of transitional objects, 'which must seem to give warmth, or to move, or to have texture, or to do something that seems to show it has vitality or reality of its own' (Winnicott 1974, 7).
- 7 Or until the entropy that such games have designed into them (precisely to necessitate and prompt human input) brings about the crash of the simulated city, country or ants' nest in a virtual economic and/or environmental catastrophe.
- 8 For further description of the machinic and aesthetic articulations of Lego video games (in this case, *Lego Star Wars*), see Giddings and Kennedy 2008.