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Nick Montfort and Ian Bogost (2009). *Racing the Beam: The Atari Video Computer System*. Cambridge; London: The MIT Press. ISBN 978 0 262 01257 7. 180 pages. USD 22.95.

Racing the Beam has two roles, to establish and demonstrate the methodology of 'platform studies'. It is the first of a series on 'platform studies' published by the MIT press, for which Nick Montfort and Ian Bogost are associate series editors. The book is not only a case study of the Atari VCS (commonly known as the Atari 2600), it also sets an agenda for bringing computer hardware into social sciences and humanities discussions of new media. The authors illustrate the practice of platform studies through detailed, yet lucid, technical engagements with key Atari VCS games: *Combat*, *Adventure*, *Pac-Man*, *Yar's Revenge*, *Pitfall*, and *Star Wars: The Empire Strikes Back*. Each chapter is oriented around the issues associated with the development of a particular game, with an emphasis on how the console's hardware shaped the development of the software, and how the creative programming of game designers pushed the technological limits of the platform.

The Atari VCS was the first – and until the Xbox, the last – great American console; a cultural artefact that captures the zeitgeist of the 'can-do' mentality of the early Silicon Valley pioneers. All of the games that are discussed in detail come from the consoles' heyday, although the final chapter deals with the Atari VCS after 1983. This discussion includes a brief reference to the contemporary homebrew programming scenes that still make use of the Atari VCS (Montfort & Bogost, 2009: 143-144). The continuing viability of the platform is further demonstrated in Bogost's own practices of game design: *Guru Meditation* (Bogost, 2009), was simultaneously released for the Atari VCS and the iPhone, although the latter version is a port designed to bring the game to a wider audience.

The key strength of the book is how it demonstrates the relevance of platform studies, without being overly prescriptive. At the core of the study on the Atari VCS is their argument that: 'the material constraints of the VCS hardware can be seen as providing opportunities for the creative process – not obstacles' (2009: 140). The core of the platform studies agenda is to consider how particular platforms – defined as: 'the hardware and software design of standardised computing systems' (2009: 2) – embed material limits into how computer systems may be used, whilst considering how those limits are both challenged and used creatively by programmers. The authors do not demand that the platform be privileged; rather they insist that it is acknowledged. Nor is platform studies to be restricted to videogames, they state: 'consideration of the platform can also enlighten our understanding of interactive visual art, educational programs, hypertexts, works of interactive fiction, demos, creative projects in text generation, visual and kinetic poetry, and much more' (2009: 148).

The authors cite several previous works which they consider to be 'platform aware': Galloway (2004) *Protocol: How Control Exists After Decentralization*, Jones (2008) *The Meaning of Video Games*, and Kirschenbaum (2008) *Mechanisms: New Media and the Forensic Imagination*. It

would have be useful if a little more time had been devoted to explaining how these projects overlapped and intersected with platform studies. Jones (2008: 127-149) quite explicitly follows a platform studies agenda in his chapter on the 'Wii Platform'. However, the exact relationship of the other works to platform studies is unclear. For example, one of Galloway's key notions is 'code', and Montfort and Bogost make it very clear that platforms and code are different. However, by leaving this issue open, the authors implicitly invite a variety of approaches to platform studies, suggesting that there is no particular disciplinary or methodological hierarchy that they envision for the series.

The gestures towards a notion of platform studies have previously emerged in Bogost's work. His early ruminations on platform studies are evident in the chapter 'Videogames and Expression' from *Unit Operations: An Approach to Videogame Criticism* (2006: 55-71); he points out that the use of game engines – like *Quake* engine – in game design establishes a common material substructure between games. In *Persuasive Games* (2006: 251) he states: 'the procedural affordances of a computer operating system matter, they constrain and enable the kinds of computational activities that are possible atop that operating system'. Platform studies clearly draws from this interest in the material limits of computer technology, and how programmers respond to these limits. The clear and engaging way that the author's explain these issues through the case study of Atari is the project's key strength, *Racing the Beam* does an admirable job of demonstrating the importance of platform studies as an approach to research on digital media, without becoming an all-encompassing manifesto.

In Montfort and Bogost's case study platform studies also suggest a useful approach to media histories. Their work on the Atari VCS focuses on the role of creative individuals in the process of game development for the platform, and the book earmarks several important moments in videogame history. These moments are traced back to the particular groups and individuals involved, and the authors discussion is supported by interviews with the parties involved. Each chapter unfolds and examines a specific material programming challenge and how it was overcome by creative programming. Celebrating the first ever 'Easter egg', built into *Adventure* by Warren Robinett, Montfort and Bogost (2009: 60) state: 'Computer software, produced in business contexts or otherwise, is often impersonal. Easter eggs lay a human touch on such artefacts, reconnecting them with their creators and craft practice of authorship'. Montfort's own work intersects with the history of videogames. While his book *Twisty Little Passages: An Approach to Interactive Fiction* (Montfort, 2003), deals with the historic development of interactive fiction (IF), it shares *Racing the Beam*'s concern with authorship, and with the early phases of pre-commercial videogame development.

However, the material history of the Atari VCS outlined by Montfort and Bogost explores the creative intervention of the programmer at the expense of unpacking the materiality of the platform itself. The detailed description of the microchips that made up the internal workings of the Atari VCS (2009: 12-15), makes no attempt to trace where and how these microchips were made, what materials were needed to make them, or who worked to mine, transport and manufacture these materials, under what conditions. Obviously, this was not a part of the authors' project, but such an intervention would be a useful way to make the materiality of the platform more transparent, by exposing the 'dead labour' that has gone into its production.

In *Racing the Beam*, the author's also make several interesting gestures towards how platform studies might intersect with a socio-cultural approach to videogame play. Montfort and Bogost suggest that platforms establish certain spatial arrangements: 'It is important to the history of video games that they bring their persuasive powers to bear within specific

architectural spaces, enticing players to enter and remain within certain places' (2009: 8). They deal with a similar concern in their discussion of *Combat*. Noting that many of the earlier Atari games were ports of arcade games (2009: 14), Montfort and Bogost then point out:

> When an earlier game is the basis for a VCS game, it can almost never be reproduced on the VCS platform with perfect fidelity. The platforms are not the same computationally, for one thing, which is particularly important. The contexts of home play are not the same, either (2009: 23).

The idea that platforms are also culturally situated emerges again in the discussion of *Pitfall!*. *Pitfall!* features several major innovations: first, the sheer size of the virtual world, second, it had a built-in twenty minute time-limit; finally the game world was randomly generated. Together these factors gave the game a high level of replayability (2009: 100-112). Montfort and Bogost argue that these features made the game: 'particularly well suited for the living room or den' (2009: 112). Arcade games had financial and social incentives for the quick turn-around of players, and *Pitfall!* suggests: 'a moment when arcade play gave way to a different form of home console play' (2009: 113).

Racing the Beam is a significant publication for the readers of *Digital Culture & Education* for two reasons: the detailed material history of the Atari VCS; and the introduction of platform studies. I think that two additional conceptual issues are also worth highlighting: first, the emphasis that Montfort and Bogost place on the creativity of programmers; and second, the way that the platform studies approach highlights the historic emergence of specific genres of videogame. The issue of creativity and design is an important one, given that recent scholarship suggests that an understanding of 'design' is a key component of gaming literacy (e.g. Salen, 2007; 2008; Zimmerman, 2009). The principles of game design and particularly what is a 'good' game are presumably in negotiation with this material limits suggested by platform studies. The approach then provides scope for considering how 'design' and creativity may not necessarily be entirely congruent.

Montfort and Bogost also suggest several important ways that the constraints of early game design have coagulated into enduring genre conventions. For example, *Adventure* is discussed a canonical action-adventure game that introduced the convention of having the screen represent only part of the game's virtual space (2009: 46). This innovate solution to a design problem of translating a text-based to graphic interface became an industry standard, and has continued to be used in high profile games like *Legend of Zelda: The Minnish Cap* (Nintendo, 2005). This insight is very helpful in developing a historic understanding of videogame genres that focuses on the materiality of their production, rather than the visual continuum that the output may have with other screen media (see Apperley, 2006).

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