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# 'A Marriage of Freud and Euclid': Psychotic Epistemology in *The Atrocity Exhibition* and *Crash*

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**Abstract:** The writings of J.G. Ballard respond to the sciences in multiple ways; as such his (early) writing may productively be discussed as science fiction. However, the theoretical discipline to which he publicly signalled most allegiance, psychoanalysis, is one whose status in relation to science is highly contested and complex. In the 1960s Ballard signalled publicly in his non-fiction writing a belief in psychoanalysis as a science, a position in keeping with psychoanalysis' contemporary status as the predominant psychological paradigm. Various early Ballard stories enact psychoanalytic theories, while the novel usually read as his serious debut, *The Drowned World*, aligns itself allusively with an oft-cited depiction by Freud of the revelatory and paradigm-changing nature of the psychoanalytic project. Ballard's enthusiastic embrace of psychoanalysis in his early 1960s fiction mutated into a fascinatingly delirious vision in some of his most experimental work of the late 1960s and early 1970s of a fusion of psychoanalysis with the mathematical sciences. This paper explores how this 'Marriage of Freud and Euclid' is played out in its most systematic form in *The Atrocity Exhibition* and its successor *Crash*. By his late career Ballard was acknowledging problems raised over psychoanalysis' scientific status in the positivist critique of Karl Popper and the work of various combatants in the 'Freud Wars' of the 1990s; Ballard at this stage seemed to move towards agreement with interpretations of Freud as a literary or philosophical figure. However, despite making pronouncements reflecting changes in dominant cultural appraisals of Freud, Ballard continued in his later writings to extrapolate the fictive and interpretative possibilities of Freudian and post-Freudian ideas. This article attempts to develop a deeper understanding of Ballard's 'scientific' deployment of psychoanalysis in *The Atrocity Exhibition* and *Crash* within the context of a more fully culturally-situated understanding of psychoanalysis' relationship to science, and thereby to create new possibilities for understanding the meanings of Ballard's writing within culture at large.

**Keywords:** J.G. Ballard; science; Freud; psychoanalysis; mathematics; geometry

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J.G. Ballard was a writer whose work responded to the sciences in multiple ways; as such his writing, particularly his early short fiction, accords with many definitions of science fiction. However, the theoretical discipline to which he publicly signalled the most allegiance, psychoanalysis, is one whose status in relation to science is highly contested and complex. Ballard's entire oeuvre can be read as an ongoing response to Freud's theoretical writing, but, in particular, *The Atrocity Exhibition* and *Crash*, which together represent the avant-garde high-point of his novelistic career, explore a speculative hybridisation of psychoanalysis and geometry represented as a psychotic response by protagonists to disorienting twentieth-century machine and media landscapes. Through this surrealistic hypothesis played out across Ballard's experimental texts, scientific and quasi-scientific languages become implicated in what Ballard portrays as the madness of mid-to-late twentieth-century modernity.

I shall begin what follows by contextualising my previous research on Ballard's engagement with psychoanalysis in relation to the debate over psychoanalysis' scientific or non-scientific status which has developed throughout its history, with particular reference to Karl Popper's well-known positivist critique of Freud, the famous 1990s 'Freud Wars' and recent explorations of the possibility of

a neurologically-informed ‘neuropsychanalysis’. After briefly reconsidering Ballard’s deployment of psychoanalytic ideas in his earlier writing (on which I have written at greater length elsewhere), I shall examine *The Atrocity Exhibition* and *Crash* in turn, tracing Ballard’s exploration of his concept of a ‘Marriage of Freud and Euclid’, a surrealist fusion of psychoanalysis and geometry, as it is elaborated across these two difficult fictions. In a concluding note, I shall discuss Ballard’s own implied rhetorical engagement with the question of psychoanalysis as a science as it developed across his career, and briefly hint at further possible directions in exploring his work’s dialogue with the ambivalently-situated set of discourses and disciplines that psychoanalysis has become.

## 1. Science, Science Fiction, Psychoanalysis

Science fiction as a generic designation is inherently oxymoronic, fusing together science, a ‘branch of study that deals with a connected body of demonstrated truths or with observed facts systematically classified’, and fiction, prose literature ‘concerned with the narration of imaginary events and the portraiture of imaginary characters’ (OED Online. Hp 2018). More recent critical surveys of the genre have stressed its materialist or technological preoccupations: Adam Roberts (1999) stresses how ‘the premise of an SF novel requires material, physical rationalisation, rather than a supernatural or arbitrary one’, although ‘sometimes the materialism is not, strictly speaking, scientific’ (Roberts 1999, p. 5); Roger Luckhurst (2005) emphasises science fiction as ‘a literature of technologically saturated societies’ (Luckhurst 2005, p. 3). In an interesting contrast, earlier influential definitions of science fiction proposed during the 1970s seem to cohere instead around concepts of the cognitive. Robert Scholes (1975) defined SF as ‘structural fabulation’, ‘fiction that offers us a world clearly and radically discontinuous from the one we know, yet returns to confront that known world in some cognitive way’ (Scholes 1975, p. 29). Darko Suvin (1979) offered ‘the literature of cognitive estrangement’ as his formulation, stressing the co-existence of human faculties for rational cognition and a state of wonder or unknowing in the genre (Suvin 1979, p. 4).

This focus on the cognitive reflects the influence of a turn in (at least British) science fiction of the 1960s and 1970s away from a preoccupation with hard science towards an emphasis on the possibilities of subjectivity and a less stable sense of a unified and coherent reality. In *The Entropy Exhibition*, his study of the history of *New Worlds*, the magazine edited by Michael Moorcock in which much of Ballard’s early short fiction was published, Colin Greenland emphasises a turn towards subjectivity as characteristic of the ‘New Wave’ of British science fiction writers published in the magazine. For Greenland, although ‘they did not seek authorisation from scientists [ . . . ] they recognised that the trend in physics as in psychology had been away from absolutes toward the relative and contingent’ (Greenland 1983, p. 55); for these writers, ‘the time had come for sf to re-emphasise the subjective imagination, to turn from hard science to soft speculation’ (Greenland 1983, p. 56). Ballard’s own early short fiction and novels can be read as leading exemplars within this trend, and in the non-fiction pieces and manifestos he published in *New Worlds* and elsewhere at this period Ballard was forthright in championing the reorientation of science fiction towards ‘inner space’ and espousing a redefinition of science fiction as ‘speculative fantasy’ (Ballard 1997, pp. 197, 200).

As such Ballard’s writing of the 1960s and 1970s should be understood within the context of a wider culture within science fiction of de-emphasising the ‘demonstrated truths or [ . . . ] observed facts’ of science conventionally conceived as an empirical and rationalistic discourse. However, in the context of a critical collection exploring Ballard’s relation to the sciences, to develop a broader understanding of the cultural position of Freudian psychoanalysis in relation to science will serve as a useful step towards a more sophisticated and contextualised understanding of the meanings of Ballard’s writings—considered as highly Freudian-influenced fictions—within culture at large. In discussing the ‘New Wave’ and *New Worlds*, Greenland makes little mention of Freud, focusing instead on the influence on 1960s culture of two other controversial psychological thinkers: Freud’s Swiss rival and collaborator C.G. Jung and the Scottish ‘anti-psychiatrist’ R.D. Laing (Greenland 1983, pp. 53–55, 65–67). Jung developed his own esoteric, spiritually-inflected and highly influential strain of depth

psychology partly out of his ‘constant debate with Freud’ (Frey-Rohn 1974, p. xi); Laing was heavily influenced in his practice of psychiatry by the philosophical influence of Sartre, although Andrew Collier has suggested that, methodological considerations aside, ‘one can see far more continuity from Freud than is usually admitted’ (Collier 1977, p. ix). Ballard’s fictions engage in fascinating ways with the writings of both these unique post-Freudian thinkers, as I have explored in detail elsewhere (Francis 2011, pp. 43–52, 120–25); in order manageably to limit the scope of enquiry I shall however in this article focus exclusively on Freud in light of the foundational status of his writings within psychoanalysis.

Psychoanalysis began with pretensions to the status of science, but the story of its relationship to science is long and controversial; the following sketch of aspects of the substantial literature on the relationship should provide some context within which to locate Ballard’s psychoanalytic science fictions. In his *A History of Psychiatry* Edward Shorter narrates how, beginning in the 1930s and peaking in the 1960s, psychoanalysis became the dominant paradigm in American psychiatry, causing what he sees as a ‘hiatus’ of ‘scientific stagnation’ before the advent of ‘the second biological psychiatry’ combining genetics, psychopharmacology and neuropsychology (Shorter 1997, pp. 145, 154, 238). However, perhaps the most famous interrogation of psychoanalysis’ scientific status was made by philosopher Karl Popper, beginning in *The Logic of Scientific Discovery*, published in English in 1959. Popper attacked psychoanalysis as ‘at best a pseudo-science and at worst complete nonsense’, citing its reliance on a verificationist methodology where ‘theories are tested by looking for confirming evidence’ as opposed to being tested by being exposed to the possibility of falsification (McGee 2004, p. 14). Popper criticised the ‘empiricist view of science’ known as ‘logical positivism’ espoused by ‘a loose grouping of scientists and philosophers who worked in Vienna in the 1920s and 1930s’ (Farrell 2014, p. 8), claiming that their verificationist or inductive methods did not answer what he called “the problem of demarcation” between science and non-science; for Popper psychoanalysis was an instance of a non-science demonstrating this failing (Farrell 2014, p. 15).

Philosopher of science Adolf Grunbaum developed an incisive critique of the logic and consistency of Popper’s view, offering Freud’s 1915 paper on paranoia as an example of how Freud’s theories could indeed potentially be falsified (Grunbaum 1989, p. 147) and pointing to ways in which the non-falsifiability Popper claimed as the hallmark of psychoanalysis’ non-scientific status could also be possible in the physical sciences (Grunbaum 1989, p. 151). For Grunbaum, ‘More often than not, the intellectual defects of psychoanalysis are too subtle to be detected by his criterion of demarcation’ (Grunbaum 1989, p. 156). However, Grunbaum concedes that Popper’s critique has perhaps ‘had some value sociologically by putting psychoanalysts on notice to become more accountable scientifically’ (Grunbaum 1989, p. 156).

Popper’s critique has also been problematised by Thomas Kuhn who sees Popper’s model of science as disregarding his own theory of the development of science as a ‘punctuated evolution’ rocked by periodic paradigm shifts (McGee 2004, p. 15). In her short summary ‘Psychoanalysis: Science, Non-science or Nonsense?’, Jane McGee refuses to draw a definite conclusion on the scientific status of psychoanalysis, but concludes by pointing to suggestions ‘that psychoanalysis has more in common with the modern work being carried out in the philosophy of science’, and that while ‘Freud perceived himself as a traditional scientist, [ . . . ] in fact his theory displays all the features of the modern view of science, built up by work in the history and philosophy of science’ where ‘all data’ are viewed as ‘theory-laden’ and all science is therefore predicated upon theoretical assumptions (McGee 2004, p. 15).

Two books on the relationship between psychoanalysis and science from either side of Shorter’s peak decade for psychoanalysis’ influence, the 1960s, offer useful cross-sections through this evolving debate. In *Psychoanalysis as Science*, published in 1952, Ernest R. Hilgard, in tentative tone, sees Freud as ‘a controversial figure, related to psychology more as Marx is related to economic than as Darwin is to biology or Einstein to physics’ (Hilgard et al. 1952, p. 3), but is also ready to assert that ‘[i]t has been possible to parallel many psychoanalytic phenomena in the laboratory’ (Hilgard et al. 1952, p. 42). In the same book, made up of three main essays, psychoanalyst Lawrence S. Kubie issues an

appeal for ongoing cooperation and integration between psychoanalysis and science, suggesting that '[p]sychoanalysts as scientists and psychoanalysis as a body of knowledge about human personality need the co-ordinated help of their fellow scientists' (Hilgard et al. 1952, p. 111). A 1972 issue of the dedicated journal *Psychoanalysis and Contemporary Science* edited by Robert R. Holt and Emanuel Peterfreund demonstrates the extent to which this dialogue had developed over the intervening two decades, with sections covering approaches to psychoanalysis including general theoretical, psycholinguistic, developmental, clinical and quantitative, psychohistorical and psychobiographical, reflecting the continued diversification of psychoanalytic discourse and its influence on and hybridisation with various scientific disciplines (Holt and Peterfreund 1972, pp. ix–x). By this time a cultural backlash against psychoanalysis was developing, and in his contribution to *Psychoanalysis and Contemporary Science* Frederick G. Worden bemoans a contemporary 'widespread conviction among youth that "shrinks" are agents of a sick society set upon making people "adjust"' (Holt and Peterfreund 1972, p. 40), and responds to the problematic of psychiatry's relation to science by citing a 1966 suggestion that in discovering the meaningfulness of symptoms 'Freud moved from the logic of science to the logic of the humanities, because a meaning is not a product of causes, but is the creation of a living subject' (Holt and Peterfreund 1972, p. 43), echoing the influential conception of psychoanalysis as a hermeneutic and interpretational rather than scientific discipline inaugurated around the same time by Jurgen Habermas in his 1971 book *Knowledge and Human Interests* (Gomez 2005, p. 7).

In the mid-1990s, revisionist histories of Freud and his work triggered the so-called 'Freud Wars', 'an acrimonious exchange of reviews, responses and counter-charges on the nature and validity of psychoanalysis' taking place in the pages of the *New York Review of Books* (Gomez 2005, pp. 5–6). Drawing on Grunbaum's critique of psychoanalysis' scientificity in his 1984 *The Foundations of Psychoanalysis*, Frederick Crews' 1993 *The Unknown Freud* initiated the wars by characterising psychoanalysis, according to Lavinia Gomez, as 'a vast confidence trick played on suggestible patients and an unwary public' (Gomez 2005, p. 6). Crews' articles from the debate, reprinted in *The Memory Wars: Freud's Legacy in Dispute* (Crews et al. 1997) refer to Grunbaum in support of the claim that "'clinical validation" of Freudian hypotheses is an epistemic sieve' (Crews et al. 1997, p. 34) and depict a 'notably willful and opportunistic Freud' (Crews et al. 1997, p. 35) guilty of financial swindling (Crews et al. 1997, p. 38) and 'psychiatric malpractice' in the case of Felice Bauer (Crews et al. 1997, p. 50).

Thomas Nagel's *Freud's Permanent Revolution* (1994) contested Grunbaum's critique of Freud, asserting that psychoanalysis 'succeeded in transforming our views of what a person is, within a broader conception of empirical science' (Gomez 2005, p. 6); both Grunbaum and Nagel rejected the view of psychoanalysis as an interpretational rather than scientific discipline offered by Habermas (Gomez 2005, p. 7). Collecting interventions by Grunbaum, Nagel, and Habermas, Gomez's *The Freud Wars* characterises their debate as ultimately inconclusive, diagnosing their disagreement as being rooted in their common presumption that psychoanalysis can be understood in terms of 'theories which uphold the theories of matter and the body on the one hand, or theories of culture and the mind on the other' (Gomez 2005, p. 14). For Gomez '[t]he empirical-hermeneutic distinction is a dichotomy which goes back to the very root of western thought. It is the matter-mind divide transposed to the theoretical level' (Gomez 2005, p. 8), but Freud troubles this theoretical dualism: 'Freud's 'underlying philosophy is neither wholly scientific nor wholly interpretative. He seems to hold a picture of reality which/pre-empts the division into the mental and physical modes on which empirical and hermeneutic approaches rest' (Gomez 2005, pp. 14–15). For Gomez this aspect of Freud has been illuminated by Sebastian Gardner (Gardner 1993) and Peter Strawson (1959), who have suggested how '[i]nstead of the empirical basis in the body, or the hermeneutic basis in the mind, psychoanalysis goes back to the psychophysical basis of the person, as the source from which all thinking must arise' (Gomez 2005, p. 15).

The 'Freud Wars' have provoked a range of responses from the psychoanalytic community. Kurt Jacobsen's *Freud's Foes: Psychoanalysis, Science, and Resistance* (Jacobsen 2009) is an emotively-charged defence of Freud which contends that 'Freud's foes propagate a naïve and misleading notion of

scientific inquiry, that public images of Freud are invidiously skewed, that Freud's views on hot-button issues such as women, deviance, and social influences are mischaracterized, and that Freud, for all his real shortcomings, was a scientist of great acuity whose conscientious work is entitled to balance reappraisals, not jihads' (Jacobsen 2009, p. 10). A less partisan meditation on similarities and differences between scientific and psychoanalytic methodologies was offered the same year by Robert Caper in *Building Out into the Dark: Theory and Observation in Science and Psychoanalysis*. Caper points out that unlike science, '[p]sychoanalysis studies phenomena that cannot be replicated or controlled in any precise way' and that 'the events that psychoanalysis studies are states of mind, which are not replicable' (Caper 2009, p. 6). He concedes that psychoanalysts have been unable to combine their theoretical premises 'with observations to generate theories that, like those of physics or evolutionary biology, have become part of a theoretical canon' (Caper 2009, p. 21), and suggests that, like the science of paranormal phenomena, '[p]sychoanalysis is another example of a discipline that is complementary with what [Freeman] Dyson calls reductionistic science—science employing the method of controlled experimentation' (Caper 2009, p. 26). A further thoughtful approach is offered by psychoanalyst Paul L. Wachtel in 'Epistemological Foundations of Psychoanalysis: Science, Hermeneutics, and the Vicious Circles of Adversarial Discourse' (Wachtel 2014). Wachtel critiques the insistence by psychoanalysis' scientific critics on empirical validation: 'This demand, all too often, derives from a version of science that looks more like an obsessive-compulsive symptom than the creative and disciplined application of the human intellect' (Wachtel 2014, p. 141). He suggests that 'if we have a less ritualistic or obsessive-compulsive understanding of what science is then there are possibilities of harnessing its safeguards while also employing the same empathic and perceptive capacities of the clinician that she relies on in the consulting room' (Wachtel 2014, p. 146).

In the same year as Wachtel's article an intervention in the tellingly-named journal *Neuropsychoanalysis* affirmed a sense of psychoanalysis' ongoing relevance to the scientific study of human psychology. In 'Science, Epistemology, and Future Prospects for Psychoanalysis', Baland Jalal, Bonnie L. Settlage and Vilayanur S. Ramachandran draw attention to work by Jane Flax, who responded to Popper and Grunbaum by suggesting that 'psychoanalysis does not fit into existing philosophies of science and [ . . . ] that since the Western scientific tradition is currently "problematic," the question about whether psychoanalysis is scientific or not, "can have no definite answer" (Jalal et al. 2014, p. 116). These authors take issue with Flax's 'hermeneutic-based psychoanalysis' (Jalal et al. 2014, p. 117), contending that 'empiricism and empirical evidence do—*contra* Flax's view—have an epistemic privilege' (Jalal et al. 2014, p. 118); in fact, for them 'such a model of science will provide a solid framework for the flourishing of psychoanalysis' (Jalal et al. 2014, p. 118).

Jalal, Settlage, and Ramachandran point to a variety of recent scientific developments which may intersect with psychoanalysis including 'mind-body research', the study of intersubjectivity, work by Giacomo Rizzolatti on mirror-neurons and 'the neuroscience of social interaction, also known as "second-person neuroscience"' (Jalal et al. 2014, p. 119). Acknowledging calls for psychoanalysis to 'engage in a productive dialog with the neurosciences' (Jalal et al. 2014, p. 119), the authors point to the emergence of work on 'the "cognitive unconscious"' and the 'neural basis of the mental and emotional processes taking place out of awareness' (Jalal et al. 2014, p. 120), suggesting that 'remarkable new discoveries may provide a foundation for a scientific investigation of psychoanalysis, just as Freud predicted' (Jalal et al. 2014, p. 121).

Jalal, Settlage, and Ramachandran acknowledge the existence of a hermeneutic school of thought which 'argues that science is irrelevant to psychoanalysis' (Jalal et al. 2014, p. 121), explaining that while 'science aims for the replicability and predictive utility that is found in empirical verification and scientific truth-claims, hermeneutic psychoanalysis aims at interpretation and seeking to understand meaning and intentions' (Jalal et al. 2014, p. 122). Although 'Freud's own ambition was to keep psychoanalytic theory unified' (Jalal et al. 2014, p. 122), and although they query the ethical basis for offering therapeutic interventions based on hermeneutic psychoanalysis (Jalal et al. 2014, p. 123), Jalal, Settlage and Ramachandran 'see neuropsychoanalysis as representing one "branch" or "version" of

psychoanalysis that should and must continue to grow alongside other models of psychoanalysis, and should not monopolize the field' (Jalal et al. 2014, p. 123). 'When clearly demarcated, such diversification of Freudian theory and thought underscores the viability of Freud's thought, rather than the decline' (Jalal et al. 2014, p. 124).

Although the debate over the relationship between science and psychoanalysis continues, and although since its twentieth-century heyday it has 'lost its influence and prominence as a theory of mind and a method of therapy' (Jalal et al. 2014, p. 119), it thus seemingly remains a discourse of theoretical promise and usefulness to scientific researchers into human neurology and psychology as the third decade of the Twenty-first Century approaches. With this broad image of the cultural and scientific status of psychoanalysis in mind I now turn to a consideration of Ballard's fictional reinterpretations of psychoanalysis throughout his career and particularly in *The Atrocity Exhibition* and *Crash*.

## 2. Psychoanalysis in Ballard's Earlier Writing

In the 1960s Ballard signalled publicly in his non-fiction writing a belief in psychoanalysis as a science, a position in keeping with psychoanalysis' status as the predominant psychological paradigm of the moment. Ballard's 1962 manifesto on the future of science fiction, 'Which Way to Inner Space', implies a reorientation of the genre towards the subjective realm mapped by psychoanalysis; its call for 'more psycho-literary ideas, more meta-biological and meta-chemical concepts' (Ballard 1997, p. 197) evokes the disciplinary and generic hybridity of many of Freud's own writings. Ballard's 1966 essay on Surrealist art 'The Coming of the Unconscious' makes an overt rhetorical identification of psychoanalysis as a science, evoking Surrealist art's 'calculated submission of the impulses and fantasies of our inner lives to the rigours of time and space, to the formal inquisition of the sciences, psychoanalysis pre-eminent amongst them' (Ballard 1997, p. 84). Several stories of this period use Freud's theories in ingenious ways to inform the material of their narratives. 'The Watch-Towers' (1962) dramatises Freud's theory of the super-ego as a psychological internalisation of parental prohibitions encountered in childhood, with Ballard's protagonist Renthall cheerfully flouting the sexual mores of his society until, in a chastening twist, the eponymous and ambiguously real super-egoic watch-towers of the title come to dominate his reality. 'The Cage of Sand' (1962) uses an orbiting satellite as a symbol of the cyclical arrest of Freudian melancholia, with the satellite's ultimate fall back to earth implying a therapeutic return of repressed trauma in protagonist Bridgman. In his non-fiction and fiction writing of this period, Ballard pulled off a balancing act in relation to psychoanalysis, at the same time expanding the remit of the science fiction genre through his fictional cannibalisations of this ambivalently scientific discourse and emphasising the relevance and truth-value of his psychoanalytic science fictions by constructing psychoanalysis as a valid, even 'pre-eminent' scientific discipline. Although never a writer of 'hard' science fiction, Ballard's commitment to a quasi-scientific methodology in the sense of 'rigour' and 'formal inquisition'—also expressed for example in his 1974 introduction to the French edition of *Crash*, where he writes of the writer's role as being 'that of a scientist' testing hypotheses against observed facts (Ballard 1974, 'Introduction to Crash')—arguably persisted throughout his writing career, still evident in his late novels with their willingness to work through the implications of difficult hypotheses about human nature.

Published the same year as 'The Watch-Towers' and 'The Cage of Sand', the novel usually read as Ballard's serious debut absorbs into its narrative the language of Freud's most famously triumphal appraisal of his own project. *The Drowned World* (Ballard 2014) amalgamates ideas from both Freud and his collaborator and rival Jung, envisioning a climatically devolved Triassic future in which the protagonist undergoes a Jungian reintegration with the archetypal collective unconscious also suggestive of Freud's hypothesis in his late essay 'Beyond the Pleasure Principle' of an instinctual impulsion towards death shared by all living organisms (Freud 1973, p. 38; Luckhurst 1997, pp. 51–58, 69–72; Francis 2011, pp. 68–77). During a dive into a flooded planetarium, protagonist Kerans perceives the pattern of cracks in the planetarium dome as an 'unfamiliar zodiac, watching it emerge before his

eyes like the first vision of some pelagic Cortez emerging from the deeps to glimpse the immense Pacifics of the open sky' (Ballard 2014, pp. 108–9). The reference to Spanish conquistador Hernan Cortès provides an intertextual link to Freud's well-known letter to Wilhelm Fliess in February 1900, shortly after completing *The Interpretation of Dreams*, where he compares his explorations in the unconscious to Cortès journey of conquest and discovery in Mexico and states that 'I am actually not at all a man of science, not an observer, not an experimenter, not a thinker. I am by temperament nothing but a conquistador—an adventurer' (Freud 1985, p. 398). The narratorial comparison of Kerans to 'Cortez' underlines Kerans' story as a narrative analogue of Ballard's proclaimed fictional reorientation of science fiction towards interiority and the unconscious under the aegis of Freudian theory. Ballard re-scripts Freud's grandiose colonial metaphor in evolutionary, biological terms to serve his text's sense of excitement at exploring new inner worlds of psychic reality. But over the decade following the success of *The Drowned World* Ballard would develop the possibilities he perceived in Freud's writing into even stranger forms, hybridising psychoanalysis with one of the foundational disciplines in mathematics as a means of exploring the 'inner space' of the late twentieth-century contemporary.

### 3. 'Marriage of Freud and Euclid': *The Atrocity Exhibition*

Over the course of his two most difficult fictions, *The Atrocity Exhibition* (Ballard 2014) and *Crash* (Ballard 2014), Ballard explored in speculative mode the possibility of a hybridisation of psychoanalytic science with geometry, a significant strand within the key conceptual language underlying modern science: mathematics. This hypothetical hybridisation is most boldly evoked in the chapter 'Tolerances of the Human Face', which itself contains a section entitled 'Marriage of Freud and Euclid' in which it is narrated that '[t]hese embraces of Travers' were gestures of displaced affections, a deformed marriage of Freud and Euclid' (Ballard 2014, p. 118). This 'marriage of Freud and Euclid' brings together the work of the father of psychoanalysis with that of the ancient Greek founder of modern geometry: Euclid compiled his *Elements*, 'a definitive treatment in 13 volumes of Greek plane and solid geometry and number theory', around 300AD (Greenberg 2008, p. 8). 'Euclid's approach to geometry has dominated the teaching of the subject for over two thousand years. Moreover, the axiomatic method used by Euclid is the prototype for all of what we now call "pure mathematics"' (Greenberg 2008, p. 9). Central to Euclidean geometry is the axiomatic method, 'a method of proving that results are correct' (Greenberg 2008, p. 9); repetition of the procedure of proof leads to the reaching of 'some statement that you already accept, one I do not need to justify. That statement pays the role of an axiom or postulate' (Greenberg 2008, p. 10). The title of Euclid's treatise, 'Elements of Plane Geometry', the 'elements' implying the different 'definitions, axioms, theorems, and proofs' of which it is made up (Katz 2014, p. 51), is suggestive for Ballard's work given the recurrence of the concept of the 'element' in Ballard's writing—listed, for example, 72 times in Mike Bonsall's online concordance of the Ballard corpus (Bonsall). Ballard's 'marriage of Freud and Euclid', combining the psychological and the geometrical, suggests the ideal conceptual formula for analysing the 'inner space' which Ballard's 1962 manifesto declared the focus of his fiction (Ballard 1997, p. 197). However, even as *Atrocity* proffers this fascinating fusion of epistemes for consideration it simultaneously undermines it. In *Truth in Mathematics*, H.G. Dales and G. Oliveri note that 'different conceptions of what it means to say of a statement that it is true give rise to different and mutually incompatible theories and to mutually exclusive positions on whether there are such things as mathematical knowledge and reality' (Dales and Oliveri 1998, p. 1). The 'Confusion of Mathematical Models' evoked in *Atrocity* (Ballard 2014, p. 93) gestures towards a similar sense of a lack of unified truth in mathematics, suggesting this most foundational of epistemological tools as an inadequate means of isolating reality, as complicit in the disorientation underlying contemporary cultural psychosis.

Epistemology is 'the theory of knowledge, esp. with regard to its methods, validity, and scope, and the distinction between justified belief and opinion' (OED Online. Hp 2018); as such it can be closely identified with the human practice of 'science', the Latin root of whose very name means 'knowledge' (OED Online. Hp 2018). Potentially troubling Brian McHale's distinction

between Modernist fiction as characterised by an epistemological and Postmodernist fiction by an ontological dominant (McHale 1987, pp. 6–11), Ballard's 'marriage of Freud and Euclid' implies an epistemological and ontological project on the part of his protean and seemingly insane protagonist or protagonists, variously named Travis, Talbot, etc., of attempting to isolate a valid reality or meaning amid the disorienting contemporary mediascape and thereby make sense of the protagonist's own existence. Ballard's theoretical mouthpiece Dr Nathan evokes such an isolation of reality through Freudian-Euclidean techniques when he evokes a conjunction of 'the tragedies of Cape Kennedy and Vietnam mimetized on billboards', 'the immediate personal environment' and 'the inner world of the psyche': 'Where these planes intersect, images are born, some kind of valid reality begins to assert itself' (Ballard 2014, p. 72). The image is precisely a geometrical one of planar intersection, figured in Nathan's quasi-psychiatric diagnosis of the protagonist's psychotic thought-processes as giving rise to a perceptible and psychologically knowable reality.

Across the short narratives making up *The Atrocity Exhibition*, Ballard's surrealist concept of a psychoanalytical geometry is the protagonist's key tool in an insane epistemological-ontological quest. In 'You: Coma: Marilyn Monroe' the ontological significance of Tallis' sexual-mathematical preoccupation is signalled by the implication of its existential importance to the protagonist: 'This cool-limbed young woman was a modulus; by multiplying her into the space and time of the apartment he would obtain a valid unit of existence' (Ballard 2014, p. 57). In 'Notes Towards a Mental Breakdown' Karen Novotny's physique, represented in sexual and geometrical terms, offers for Trabert the possibility of in some sense representing, formulating or otherwise coming to know the nature of his own psychic life, the 'dreams and obsessions' which were the raw data in Freud's theoretical researches: 'In the planes of her body, in the contours of her breasts and thighs, he seemed to mimetize all his dreams and obsessions' (Ballard 2014, p. 69).

Traven's search is figured in specifically mathematical terms as being variously for conjunction, for a 'modulus', for equation or equivalence. In 'The University of Death' Talbot recognises in 'the junctions of the underpass and embankment' 'a modulus that could be multiplied into the landscape of his own consciousness' (Ballard 2014, p. 26). In 'The Summer Cannibals' the unnamed protagonist wonders 'What act between them would provide a point of junction?'; a section entitled 'Elements of an Orgasm' itemises geometrical details including 'the conjunction of aluminized gutter trim with the volumes of her thighs' (Ballard 2014, p. 96). 'Conjunction' in mathematics denotes an operation in logic, 'the binary TRUTH-FUNCTIONAL sentential connective that forms a compound sentence from two given sentences, and corresponds to the English and' (Borowski and Borwein 2002, p. 187). 'Modulus' is a term with various meanings among which are 'the absolute value of a real or complex number' (OED Online. Hp 2018) and 'an integer that can be divided exactly into the difference between two given integers, so that they are CONGRUENT MODULO that divisor' (Borowski and Borwein 2002, p. 368). Conjunction indicates a logical relationship; modulus implies an identifiable absolute value or, again, a relationship of congruence: it is precisely a sense of relationship, connection or congruence which Ballard's deranged protagonists, like the schizoid individuals discussed in R.D. Laing's *The Politics of Experience* (Laing 1967), are seeking; they are attempting, through a psychotic fusion of mathematics and psychoanalysis, to make sense of that radically disorienting world of proliferating technological analysis and electronically reproduced ultra-violence which has driven them insane.

Other examples of mathematical terminology underscore this implication. For Talbert in 'The Great American Nude' 'soon the parallax would close, establishing the equivalent geometry of the sexual act with the junctions of this wall and ceiling' (Ballard 2014, p. 83). Dr Nathan underlines the ontological nature of Talbert's quest when he asserts that '[f]or him all junctions, whether of our own soft biologies or the hard geometries of these walls and ceilings, are equivalent to one another. What Talbert is searching for is the primary act of intercourse, the first apposition of the dimensions of time and space' (Ballard 2014, pp. 85–86). An equation is 'a formula that asserts that two expressions have the same value' (Borowski and Borwein 2002, p. 186); 'equivalence' is 'the relation that holds between two statements when they are EQUIVALENT, that is, when one implies the other' (Borowski

and Borwein 2002, p. 187). The equations or equivalences that the various protagonists seek imply congruence, a universe that operates according to discernible rules, is epistemologically coherent, that makes sense.

At points *Atrocity* hints at its multiply-named protagonist's quest for conjunction as aspiring to some kind of ineffable ultimate truth. In 'You: Coma: Marilyn Monroe' Tallis perceives the body of a mysterious female dancer as 'a symbol in a transcendental geometry' (Ballard 2014, p. 59), calling to mind Platonic conceptions of mathematical truths as transcendental verities. The text's preoccupation with geometry also seems to hint at the geometrical as a fundamental aspect of human beings' neurologically-based perception of reality: recalling Ballard's view of fiction as 'a branch of neurology' (Vale and Juno 1984, p. 149), the collection repeatedly evokes the concept of the 'neural interval'. In mathematics, an 'interval' is 'the set containing all real numbers or points between two given real numbers or points' (Borowski and Borwein 2002, p. 293); a brief survey of titles of available recent neurological publications touching on the term 'interval' (Valencia Torres 2012; Meck 2003) suggests that an important significance of the word for neurology pertains to neurological studies of the experience of time—a notable Ballardian preoccupation. However, the term 'neural interval' and its meanings in *The Atrocity Exhibition* would merit further research, as its deployment in a variety of surreal ways across the text seem to relate more to spatial or geometrical than to temporal contexts. The contours of camouflage on a bunker become 'the model of a face, a posture, a neural interval' (Ballard 2014, p. 3); concrete overpasses and underpasses mediate 'the geometry of a neural interval' (Ballard 2014, p. 20); an advertisement image of 'a balcony unit on the twenty-seventh floor of the Hilton Hotel, London' is glossed as "'a neural interval'" (Ballard 2014, p. 71). The unifying implied assumption across these surreal images is of correspondence between the geometry of the exterior world and the neurology of the perceiver, suggesting an attempt by the insane mind of the protagonist to isolate elements of reality in his experience. Psychosis is understood in Freudian theory as 'a rupture between ego and reality' leading to the delusional reconstruction of 'a new reality in accordance with the desires of the id' (Laplanche and Pontalis 2006, p. 372); part of *The Atrocity Exhibition's* surrealist challenge to its reader is its Laingian assertion of its textual psychosis as a potential route to existential truth, its teasing implication that the entirely irrational patterns perceived by the protagonists may in fact be meaningful, may have epistemological significance.

But the psychosis is still psychosis—the geometrical sexuality of *The Atrocity Exhibition* is insane, destructive, thanatic, an abstraction from lived reality which promises escape but is identical with destruction and dehumanisation. Many of the stories composing the collection end with the violent ritualised death of a female figure—Roger Luckhurst has saliently identified the problematic nature of the novels' obsessive insistence on 'violence and death [ . . . ] concentrated obsessively on the figure of the Woman' (Luckhurst 1997, p. 113). In 'The University of Death' Talbot is depicted as assembling 'angles and postures' into 'a conceptual equation' which will 'bring his scenario to a climax': 'The danger of an assassination attempt seems evident, one hypotenuse in this geometry of a murder' (Ballard 2014, p. 32). Geometry forms part of an irrational, violent logic in the protagonist's mind; it is part of the dehumanising abstraction of sexuality which is explored across *The Atrocity Exhibition* and *Crash*: 'Amatory elements: nil. The act of love became a vector in an applied geometry' (Ballard 2014, p. 81). All affect is drained away from sexual intercourse in a mathematically abstracted sexuality which embodies the mutual imbrication of Freudian erotic and thanatic drives: 'these peculiar geometric elements contained within them the possibilities of an ugly violence' (Ballard 2014, p. 118). As mentioned above, responding to the 'Freud Wars' Paul Wachtel evoked a 'version of science that looks more like an obsessive-compulsive symptom', evoking the 'compulsion to repeat' which in 'Beyond the Pleasure Principle' is Freud's first clue in uncovering the existence of the 'death instincts' (Freud 1973, pp. 22, 52). For the psychoanalyst Wachtel, a version of science that adheres too neurotically to mathematical measurability, to the reproducibility of experimental data, itself risks becoming an instance of deathly compulsivity. *The Atrocity Exhibition* imagines, instantiates and satirises just such a

compulsive, destructive version of science through the unceasing geometrical-sexual experiments of its alienated protagonists.

#### 4. 'A Language in Search of Objects': *Crash*

Seemingly having its genesis in the short narrative 'Crash' republished as Chapter Twelve of *The Atrocity Exhibition*, *Crash* (Ballard 2014) plays out several of the speculative concepts explored in its predecessor—including the 'marriage of Freud and Euclid'—in a more conventional narrative form. A sexualised geometry pervades the account of protagonist James Ballard's crash which triggers the narrative. Staring through his shattered windscreen at Helen Remington, a woman whose husband has just died in their head-on collision, he observes that 'the angular movements of her head appeared to mimic the distorted streamlining of the two cars' (Ballard 2014, p. 13); in his delirium 'all I could see was the unusual junction of her thighs, opened towards me in this deformed way. It was not the sexuality of the posture that stayed in my mind, but the stylization of the terrible events [ . . . ] like the exaggerated pirouette of a mentally defective girl' (Ballard 2014, p. 14). As with the protagonists of the stories in *Atrocity*, for James Ballard there is an epistemological (and ontological) quest at stake here, a search for a model or conjunction. Shortly after his collision with Helen James imagines that 'the crash between our two cars was a model of some ultimate and yet undreamt sexual union' (Ballard 2014, p. 19). As he is drawn into Vaughan's orbit the sense is that what Vaughan offers him includes a new epistemological system which will make sense for him of the machine environment: Vaughan's scars describe 'an exact language of pain and sensation, eroticism and desire' (Ballard 2014, p. 71), while his voyeuristic photographs of human/machine intersections 'summed up the possibilities of a new logic created by these multiplying artefacts, the codes of a new marriage of sensation and possibility' (Ballard 2014, p. 85).

As the forgoing quotations indicate, *Crash* develops *Atrocity's* focus on the geometry of women's bodies—the Freud of Ballard's 'marriage of Freud and Euclid' is emphatically the Freud who placed sexuality at the centre of human psychic function. For a wounded James recovering in hospital, the geometry of his orthopaedic harness 'seemed in some way related to the slopes and contours' of his nurses' bodies (Ballard 2014, p. 18); the curvatures of a thread lying across a nurse's buttock 'seemed as arbitrary and as meaningful as the wounds on my chest and legs' (Ballard 2014, p. 19). What is being described here is a geometrical abstraction of sexuality. In his 'Three Essays on the Theory of Sexuality' Freud discusses how in sexual perversions 'the mental factor must be regarded as playing its largest part in the transformation of the mental instinct'. For Freud '[i]t is impossible to deny that in their case a piece of mental work has been performed which [ . . . ] is the equivalent of the idealization of the instinct' (Freud 1973, pp. 161–62). The perverse sexuality of *Crash* is mental and cerebral, its geometrical aspect part of its mathematical abstraction from the world of embodied human physicality and the associated affective world of the emotions; listening to his wife fantasise about the body of her lesbian secretary, James reflects: 'These descriptions seemed to be a language in search of objects, or even, perhaps, the beginnings of a new sexuality divorced from any possible physical expression' (Ballard 2014, p. 24).

The psychopathic quest undertaken by *Crash's* maverick TV scientist Dr Robert Vaughan is strongly dominated by a geometrical conception of sex, a conjunction of Freudian and Euclidean epistemologies. Vaughan's experimental sexuality is persistently figured in geometrical terms: 'His hand was raised at right-angles to his forearm, measuring out the geometry of the chromium roof sill, while his right hand moved down the girl's thighs' (Ballard 2014, p. 115). This complex of images persists in Vaughan's seduction of James' wife Catherine, who is described during their sex scene as looking down at her own breast 'with rapt eyes [ . . . ] fascinated by its unique geometry' (Ballard 2014, p. 132). For Vaughan human and car bodies are alike foci of geometrical fascination, developing the Ballardian theme of an abstraction of sexuality which flattens out affect and drains human significance from the erotic encounter, making equivalent his fixation on the styled bodies of automobiles and on the breast of a schoolgirl he seduces: 'We would follow a new Buick or Ferrari for half an hour, as he studied every detail of body trim and rear deck moulding' (Ballard 2014, p. 140);

'The two of us isolated the perfect geometry of this white pear drawn from her tunic in the motion of the car along the curved road surface' (Ballard 2014, p. 141).

The same fictional logic dominates James' affair with crash survivor Gabrielle. When Vaughan shows James photographs of Gabrielle's crash and recovery, James perceives in the conjunction of hers and another's body 'a euclid of eroticism and fantasy that would be revealed for the first time within the car-crash' (Ballard 2014, p. 79). The sex scene which takes place between Gabrielle and James is described in insistently geometrical terms: James fixates on 'the jut of her left breast [ . . . ] the angular bowl of her pelvis' (Ballard 2014, p. 145) and 'the bizarre geometry of the invalid controls' (Ballard 2014, p. 145); for him 'her body, with its angular contours, its unexpected junctions of mucous membrane and hairline [ . . . ] was a ripening anthology of perverse possibilities' (Ballard 2014, p. 145). As James 'held her shoulders, feeling [ . . . ] the meeting points of hemispherical and rectilinear geometries' (Ballard 2014, pp. 147–48), he feels they are 'deciphering together these codes of a sexuality made possible by our two car-crashes' (Ballard 2014, p. 148). The consistent implication is of a psychotic strain of epistemological enquiry pursued through a cerebralised fetishism liberated from the complex developmental aetiology and heteronormative hang-ups characteristic of Freud's theorisation of fetishistic psychology (Freud 1973, pp. 152–54). Although the geometrical imagery is at its most concentrated in the scene between James and Gabrielle, it also persists into the novel's crowning moment of visionary transgression, Vaughan's homosexual seduction of James himself, who perceives Vaughan's body during their LSD-fuelled motorway tryst as 'a collection of loosely coupled planes', with the 'elements of his musculature and personality' 'suspended a few millimetres apart' (Ballard 2014, p. 163).

As in *The Atrocity Exhibition*, the abstraction of sexuality in *Crash* is monstrous, psychopathic. The totalising vision of universal equivalence between machine and human bodies which the characters evolve reduces the human to another equivalent element in the machine landscape, effacing the affect and meaning associated with human individuality; as James' affair with Gabrielle develops his fantasies spin out into a catalogue of increasingly outrageous post-Sadean scenarios: 'I visualised the injuries of film actresses and television personalities, whose bodies would flower into dozens of auxiliary orifices, points of sexual conjunction with their audiences formed by the swerving technology of the automobile' (Ballard 2014, pp. 148–49). Yet with the deliberate ambivalence characteristic both of *Atrocity* and *Crash*, Ballard simultaneously continues to hint that the cultivated insanity of the characters may be a search for 'a new logic' (Ballard 2014, p. 85), 'a new algebra' (Ballard 2014, p. 110) luring James and his wife with the promise of apocalyptic release and fulfilment: 'all these acts and emotions were ciphers searching for their meaning among the hard, chromium furniture of our minds. A car crash in which she would die was the one event which would release the codes waiting within her' (Ballard 2014, p. 149). The products of technological mass-manufacture here become metaphors for the realities of human psychological life; the patterned code is perceived as the real of which living human beings are merely reflections or functions. Returning to a more conventional narrative format, *Crash* continues to play out the avant-garde conceptualisations explored in the fragmented narratives of *The Atrocity Exhibition*: across both texts, Ballard's 'marriage of Freud and Euclid' dramatises the dehumanising insanity of a cultural landscape dominated by the abstractions of science.

## 5. 'Was He Really a Novelist?': Ballard on Freud

J.G. Ballard maintained an intellectual allegiance to Freud to the very end of his writing career: in *Miracles of Life* he states that 'I felt strongly, and still do, that psychoanalysis and surrealism were a key to the truth about existence and the human personality, and also a key to myself' (Ballard, p. 133). He continued in his later writings to explore the fictive and interpretative possibilities of Freudian ideas; examples include the structuring of *The Kindness of Women* (1991) around a dynamic of traumatic repetition and the sympathies of late novels such as *Cocaine Nights* (Ballard 1997) and *Super-Cannes* (Ballard 2001) with Herbert Marcuse's post-Freudian theories on work and the drives. However, Ballard also during this period made comments acknowledging problems over

psychoanalysis' scientific status and according with more recent interpretations of Freud as a literary or philosophical figure. Responding to claims during the 'Freud Wars' framing psychoanalysis as unscientific, critic John Forrester has suggested that we 'have to take seriously the suggestion that debates about psychoanalysis should not be couched in the form: is it an art or a science? But rather: what changes in our general categories are required by recognizing that psychoanalysis is both an art and a science' (Forrester 1997, p. 4). Less ambivalently, Perry Meisel has written about a need 'to situate Freud's achievement as a properly literary one in its own right, and one that casts Freud both as a theoretician of literature and a practitioner of it in exact and specific ways' (Meisel 2007, pp. 1–2), in particular pointing to 'Freud's characteristic trope or figure, the unconscious' as 'itself a literary rather than a thaumaturgic, scientific, or even a philosophical achievement' (Meisel 2007, p. 2). Ballard himself offered a similar interpretation of Freud in interview with the novelist Will Self in 1995, suggesting that '[a]s a therapeutic process, psychoanalysis is a complete flop, it doesn't work', but that Freud 'has the authority of a great imaginative writer': 'If you think of him as a novelist . . . if you regard all the aspects of Freud's view of the psyche as symbolic structures, as metaphors, then they have enormous power' (Self 2012, p. 309). Ten years later, in an unpublished correspondence with myself during 2005, Ballard would reiterate this take on Freud in answer to a question about the anti-psychiatrist R.D. Laing: 'Like Freud, was he really a novelist?' (Francis 2006, 'A Critical Reading', Appendix). To some degree, then, Ballard came to modify his bolder early identification of psychoanalysis as a science in line with culturally prevalent interrogations of its scientific status. Accordingly, psychoanalysis per se recedes from prominence to a degree in Ballard's later writing; as an example, the psychiatric professionals who function as charismatic antagonists in the late novels are not psychoanalysts—for example, both Sanger in *Cocaine Nights* and Penrose in *Super-Cannes* are psychiatrists (Ballard 1997, p. 64; Ballard 2001, p. 3)—authorial decisions which perhaps reflect psychoanalysis' less central status in psychological discourse in the new millennium. Ballard's ultimate loyalty was not to the discourses and disciplines indebted to Freud but to the imaginative, speculative and interpretative possibilities such discourses could facilitate in his creative process.

Contemplating Ballard as a science fiction writer making use of ideas from, in his own words, 'the sciences, psychoanalysis pre-eminent amongst them' brings the critic back fairly swiftly both to an acknowledgement of the ultimately fictional nature of science fiction and to a consideration of psychoanalysis as a literary or philosophical at least as much as a scientific phenomenon. Considering science fiction as a literature of cultural response to science, the case of psychoanalysis as it intersects with Ballard's fictional corpus and his paratextual commentary may be interpreted as an example of the way the genre evolves in parallel with gradual alterations in predominant beliefs about science, refining its attitude to scientific and quasi-scientific discourses in relation to alterations in cultural and disciplinary paradigms. It is ultimately 'psychological truth' and literary forms of truth rather than empirical and scientific ones with which Ballard is concerned (Biggsby 2000, p. 84), as his playful 2005 characterisation of his hero Freud as a novelist seems to imply. For the current writer, this characterisation by Ballard has some intuitive validity, the combination of speculation and systematisation which takes place in Freud's writing—for example, the avowedly speculative 'Beyond the Pleasure Principle'—inviting comparison between Freud's literary productions and the 'structural fabulation' in terms of which Robert Scholes defined science fiction. Whatever one's view may be of Freud, when reading Ballard's (science) fictional encounter with the ambivalently scientific discourses of psychoanalysis, one ultimately returns to the incontrovertibly literary nature of the ground on which this encounter takes place—as SF writer Keith Brooke reminds us with refreshing straightforwardness, 'the primary component of science fiction is fiction' (Brooke 2012, p. 8).

It is difficult for a critic approaching Ballard from the disciplinary territory of English Literature to say anything useful about ways in which Ballard's writing may or may not find points of resonance with current or future intersections between psychoanalysis and empirical science. With regard to more philosophical and hermeneutic regions of psychoanalytic discourse, those more closely affiliated to the literary and to the humanities, there exist considerable possibilities. Responses to Freud's thought

are pervasive across the broader domain of literary and cultural theory in the works of writers such as Theodor Adorno, Gilles Deleuze and Felix Guattari, Habermas, Fredric Jameson, Laura Marcus, Jacqueline Rose—and Ballard’s work must surely remain sympathetic to analysis in these contexts as cultural responses to Freud—and deployments of his writing to analyse culture—continue to be elaborated. As well as Popper and Grunbaum, philosophical responses to Freud by Peter Strawson (1959), Paul Ricoeur (2012), and Sebastian Gardner (1993) may offer potential new ways of interpreting Ballard’s fiction. The broad range of psychoanalytic theorists who have followed Freud must certainly also offer further possibilities in reading Ballard’s relationship to psychoanalysis—David Ian Paddy, for example, has discussed the relevance of Jacques Lacan’s analysis of desire to *The Atrocity Exhibition* (Paddy 2015, p. 96)—and I will close by pointing to some cultural-critical work inspired by Lacan which seems potentially to speak to mathematical and spatial aspects of *The Atrocity Exhibition* and *Crash* I have touched upon.

In *Psychoanalysis: Topological Perspectives: New Conceptions of Geometry and Space*, Michael Friedman and Samo Tomsic discuss psychoanalysis as ‘a deep epistemological break in the history of knowledge’ revealing thinking as ‘a conflictual process, which consists of complex spatio-temporal relations’ (Friedman and Tomsic 2016, p. 7). They draw in particular from Lacan’s developments of Freudian theory, asserting that, where Freud remained preoccupied with the question of whether psychoanalysis was a science, for Lacan the question was “‘what is a science, that includes psychoanalysis?’” (Friedman and Tomsic 2016, p. 11). Suggestively for the foregoing discussion, Friedman and Tomsic discuss Lacan’s use of mathematical terminology in his writing, his ‘different attempts to mathematise the subject and language, or rather to subjectivise mathematics’ (Friedman and Tomsic 2016, p. 21), suggesting that the effect of these is to point ‘towards the dissolution of the immediacy of the dyad being-thinking’ (Friedman and Tomsic 2016, p. 22) and to show ‘the necessity of re-emphasising the obscurity of the topological space of thinking, its structure and decentralisation’ (Friedman and Tomsic 2016, p. 24).

Friedman and Tomsic’s focus on ‘the space of thinking’ as ‘no longer rooted in a clear-cut division between the inside and the outside, but [ . . . ] paradoxical, curved and traversed with ruptures, condensations and displacements’ (Friedman and Tomsic 2016, p. 7) suggests fascinating possibilities for reading the interstitial oneiric topologies envisioned in *The Atrocity Exhibition*, with their imagined fusions of wakefulness and dream, latent and manifest, realities neuronal, electronic and concrete. However, I will not attempt within the limited scope of this discussion to relate Ballard to the new turning point in the history of epistemology in terms of which Friedman and Tomsic interpret Freud. Ballard’s writing, like all literature, exists in an imaginative space free from the rigours of empirical science, and in *The Atrocity Exhibition* and *Crash* Ballard uses that freedom to explore a speculative cross-fertilisation of psychological and mathematical sciences—a ‘marriage of Freud and Euclid’—which at once thrills the reader through its intellectual transgressions and issues a satirical admonition about the potential of modern culture’s abstract theorisations to spin out into libidinally-driven psychosis.

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## References

- Ballard, James Graham. 2014. *The Drowned World*. New York: Berkley, London: Fourth Estate. First published 1962.
- Ballard, James Graham. 2014. *The Atrocity Exhibition*. London: Cape, London: Fourth Estate. First published 1970.
- Ballard, James Graham. 2014. *Crash*. London: Cape, London: Fourth Estate. First published 1973.
- Ballard, James Graham. 1997. *Cocaine Nights*. London: Flamingo. First published 1996.
- Ballard, James Graham. 2001. *Super-Cannes*. London: Flamingo. First published 2000.

- Ballard, James Graham. 1974. Introduction to the French Edition of Crash. In *Porn Studies: Pornography, Modernity and the Historical Present*. Edited by Thomas Rob. Available online: <https://imagesoferoticism.com/2013/10/20/jg-ballard-introduction-to-crash-1974/> (accessed on 19 April 2019).
- Ballard, James Graham. 1997. *A User's Guide to the Millennium: Essays and Reviews*. London: Flamingo.
- Ballard, James Graham. *Miracles of Life: Shanghai to Shepperton: An Autobiography*. London: Fourth Estate.
- Bigsby, Christopher. 2000. In Conversation with J. G. Ballard. In *Writers in Conversation*. Norwich: EAS Publishing, vol. 2, pp. 71–86.
- Bonsall, Mike. J. G. Ballard—The Concordance. Online. Mike Bonsall. Available online: <http://bonsall-books.co.uk/concordance/framconc.htm> (accessed on 22 December 2018).
- Borowski, Ephraim J., and Jonathan M. Borwein. 2002. *Collins Dictionary of Mathematics*, 2nd ed. Glasgow: HarperCollins.
- Brooke, Keith, ed. 2012. *Strange Divisions and Alien Territories: The Sub-genres of Science Fiction*. Hampshire: Palgrave Macmillan.
- Caper, Robert. 2009. *Building Out into the Dark: Theory and Observation in Science and Psychoanalysis*. London: Routledge.
- Collier, Andrew. 1977. *R.D. Laing: The Philosophy and Politics of Psychotherapy*. Hassocks: Harvester.
- Crews, Frederick, Harold P. Blum, Marcia Cavell, Morris Eagle, Matthew Erdelyi, Allen Esterson, Robert R. Holt, James Hopkins, Lester Luborsky, David D. Olds, and et al. 1997. *The Memory Wars: Freud's Legacy in Dispute*. New York: New York Review of Books, London: Granta. First published 1995.
- Dales, Harold G., and Gianluigi Oliveri, eds. 1998. *Truth in Mathematics*. Oxford: Clarendon.
- Farrell, Martin. 2014. *Historical and Philosophical Foundations of Psychology*. Cambridge: CUP.
- Forrester, John. 1997. *Dispatches from the Freud Wars: Psychoanalysis and its Passions*. Cambridge: Harvard University Press.
- Francis, Samuel. 2006. A Critical Reading of “Inner Space”. Unpublished Doctoral Thesis, University of Leeds, Leeds, UK.
- Francis, Samuel. 2011. *The Psychological Fictions of J.G. Ballard*. London: Continuum.
- Freud, Sigmund. 1973. Three Essays on the Theory of Sexuality. In *The Standard Edition of the Complete Psychological Works of Sigmund Freud*. London: Hogarth, vol. VII, pp. 123–245. First published 1953.
- Freud, Sigmund. 1973. Beyond the Pleasure Principle. In *The Standard Edition of the Complete Psychological Works of Sigmund Freud*. London: Hogarth, vol. XVIII, pp. 1–64.
- Freud, Sigmund. 1973. Fetishism. In *The Standard Edition of the Complete Psychological Works of Sigmund Freud*. London: Hogarth, vol. XXI, pp. 147–57. First published 1961.
- Freud, Sigmund. 1985. *The Complete Letters of Sigmund Freud to Wilhelm Fliess*. Translated and Edited by Jeffrey Masson. Cambridge: Harvard UP.
- Frey-Rohn, Liliane. 1974. *From Freud to Jung: A Comparative Study of the Psychology of the Unconscious*. Translated by Fred E. Engreen, and Evelyn K. Engreen. New York: Putnam.
- Friedman, Michael, and Samo Tomsic, eds. 2016. *Psychoanalysis: Topological Perspectives: New Conceptions of Geometry and Space in Freud and Lacan*. Bielefeld: Transcript.
- Gardner, Sebastian. 1993. *Irrationality and the Philosophy of Psychoanalysis*. Cambridge: CUP.
- Gomez, Lavinia. 2005. *The Freud Wars: An Introduction to the Philosophy of Psychoanalysis*. London: Routledge.
- Greenberg, Marvin Jay. 2008. *Euclidean and Non-Euclidean Geometries: Development and History*, 4th ed. New York: Freeman.
- Greenland, Colin. 1983. *The Entropy Exhibition: Michael Moorcock and the British 'New Wave' in Science Fiction*. London: Routledge and Kegan Paul.
- Grunbaum, Adolf. 1989. The Degeneration of Popper's Theory of Demarcation. *Boston Studies in the Philosophy of Science* 117: 141–61.
- Hilgard, Ernest R., Lawrence S. Kubie, and E. Pumpian-Mindlin. 1952. *Psychoanalysis as Science*. Stanford: Stanford University Press.
- Holt, Robert R., and Emanuel Peterfreund. 1972. *Psychoanalysis and Contemporary Science: An Annual of Integrative and Disciplinary Studies*. New York: Macmillan, vol. 1.
- Jacobsen, Kurt. 2009. *Freud's Foes: Psychoanalysis, Science, and Resistance*. Lanham: Rowman and Littlefield.

- Jalal, Baland, Bonnie L. Settlage, and Vilyanur S. Ramachandran. 2014. Science, Epistemology, and Future Prospects for Psychoanalysis. *Neuropsychanalysis: An Interdisciplinary Journal for Psychoanalysis and the Neurosciences* 16: 115–27. [CrossRef]
- Katz, Victor J. 2014. *History of Mathematics*. Harlow: Pearson.
- Laing, Ronald David. 1967. *The Politics of Experience and the Bird of Paradise*. Harmondsworth: Penguin.
- Laplanche, Jean, and Jean-Bertrand Pontalis. 2006. *The Language of Psychoanalysis*. Translated by Donald Nicholson-Smith. Introduced by Daniel Lagache. London: Hogarth and the Institute of Psychoanalysis, London: Karnac. First published 1973.
- Luckhurst, Roger. 1997. *The Angle Between Two Walls: The Fiction of J.G. Ballard*. Liverpool: Liverpool University Press.
- Luckhurst, Roger. 2005. *Science Fiction*. Cambridge: Polity.
- McGee. 2004. Psychoanalysis: Science, Non-science or Nonsense? *Psychology Review* 10: 12–15.
- McHale, Brian. 1987. *Postmodernist Fiction*. London: Methuen.
- Meck, Warren H., ed. 2003. *Functional and Neural Mechanisms of Interval Timing*. Boca Raton: CRC Press.
- Meisel, Perry. 2007. *The Literary Freud*. New York: Routledge.
- OED Online. Hp. 2018. Oxford English Dictionary. Available online: <http://www.oed.com/> (accessed on 22 December 2018).
- Paddy, David Ian. 2015. *The Empires of J.G. Ballard: An Imagined Geography*. Canterbury: Gylphi.
- Ricoeur, Paul. 2012. *On Psychoanalysis*. Translated by David Pellauer. Cambridge: Polity.
- Roberts, Adam. 1999. *Science Fiction*. London: Routledge.
- Scholes, Robert. 1975. *Structural Fabulation: An Essay on Fiction of the Future*. London: University of Notre Dame Press.
- Self, Will. 2012. *Extreme Metaphors: Selected Interviews with J.G. Ballard, 1967–2008*. Edited by Simon Sellars and Dan O'Hara. London: Fourth Estate, pp. 299–319.
- Shorter, Edward. 1997. *A History of Psychiatry: From the Era of the Asylum to the Age of Prozac*. New York: Wiley.
- Strawson, P. F. 1959. *Individuals: An Essay in Descriptive Metaphysics*. London: Methuen.
- Suvin, Darko R. 1979. *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre*. New Haven: Yale University Press.
- Vale, V., and Andrea Juno, eds. 1984. *Re/Search 8/9: J.G. Ballard*. San Francisco: V/Search.
- Valencia Torres, Lourdes. 2012. *An Investigation of the Neural Mechanisms of Interval Timing Behaviour*. Nottingham: University of Nottingham.
- Wachtel, Paul. 2014. Epistemological Foundations of Psychoanalysis: Science, Hermeneutics, and the Vicious Circles of Adversarial Discourse. In *Cyclical Psychodynamics and the contextual self: The Inner World, the Intimate World, and the World of Culture and Society*. Edited by Paul Wachtel. New York: Routledge, pp. 139–52.



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