
Queer ecology: nature, sexuality, and heterotopic alliances

Matthew Gandy

Department of Geography, University College London, 26 Bedford Way,
London WC1H 0AP, England; e-mail: m.gandy@ucl.ac.uk

Received 16 May 2011; in revised form 22 September 2011; published online 10 May 2012

Abstract. This paper explores the interdisciplinary terrain of ‘queer ecology’ by using the example of an urban cemetery in North London as an empirical and conceptual starting point. Though the term ‘queer ecology’ has cropped up a few times it has yet to be addressed directly in order to consider how the seemingly disparate fields of queer theory and urban ecology might benefit from closer interaction. It will be suggested that the theoretical synthesis represented by queer ecology serves to expand the conceptual and material scope of both fields: queer theory is revealed to have only a partially developed engagement with urban nature whilst critical strands of urban ecology such as urban political ecology have yet to connect in a systematic way with queer theory, posthumanism, or new conceptions of complexity emerging from within the science of ecology itself. It is concluded that queer ecology may enrich our understanding of both urban materiality and the role of metaphors in urban theory. In particular, the idea of queer ecology illuminates the possibility for site-specific ‘heterotopic alliances’ in the contemporary city.

Keywords: Abney Park Cemetery, queer ecology, queer theory, urban ecology, urban political ecology, urban nature, heterotopia, posthumanism

1 Introduction

Abney Park is an overgrown 19th-century cemetery in North London. At the centre of a maze-like arrangement of paths lies a ruined late-Gothic chapel festooned with graffiti and now home to an assortment of bats, birds, spiders, and other creatures. In the dappled shade of this labyrinthine space a series of different visitors peacefully coexist: artists, cruisers, dog walkers, drinkers, ecologists, joggers, lovers, mourners, photographers, poets, writers, and many others. In this paper I shall use this ivy-clad corner of contemporary London as a starting point to explore some of the potential intersections between queer theory and urban ecology that might produce a conceptual terrain that we shall term ‘queer ecology’.

At its completion in 1840 Abney Park was the first nondenominational cemetery in Europe, which reflected the history of the local area of Stoke Newington as a long-standing focus for political and religious dissent.⁽¹⁾ The 32-acre site combined a garden-cemetery with an elaborate arboretum and rosarium that were also unique in Europe at the time, and featured some 2500 species of trees and shrubs from around the world. The design drew inspiration from prominent European cemeteries such as Père-Lachaise in Paris as well as the natural woodland setting of Mount Auburn Cemetery near Boston as an early example of American influence over European landscape aesthetics. The park also provides a direct continuity with the rural landscapes that were fast disappearing at the edge of 19th-century London since

⁽¹⁾Abney Park is one of seven cemeteries that were created within a decade of legislation passed in response to the lack of burial space in 19th-century London: Kensal Green (1832), West Norwood (1837), Highgate (1839), Abney Park (1840), Brompton (1840), Nunhead (1840), and Tower Hamlets (1841). Stoke Newington has long been a home for dissenters, Quakers, and other radicals, including figures such as Daniel Defoe and Mary Wollstonecraft, so it proved a natural location for Europe’s first nondenominational cemetery (see Sinclair, 1997; 2009).

the site incorporated an area once called “the Wilderness” along with many “fine old trees” originating from 17th-century landscaped grounds (Walford, 1877, page 543). These features of Abney Park form part of what the urban ecologist Ingo Kowarik terms ‘old urban nature’, comprising elements of the original landscape which have never been built on, and which have subsequently become a pivotal aspect to the ecological significance of the site.⁽²⁾

From the outset Abney Park was a complex creation with its mix of ceremonial, didactic, and moral functions to meet the aspirations of middle-class Londoners. Park design in the 19th century was based on a “strategy for moral and social reform” (Cranz, 1982, page 253), so that the interweaving of nature with urban space had a wider ideological rationale. Cemeteries were an important element in efforts to alter society through a combination of architectural design, contact with nature, and the inculcation of bourgeois morality.⁽³⁾ Yet, Abney Park proved to be a complicated landscape to sustain effectively, even in the heyday of labour-intensive municipal parks. In 1854, for example, the internationally renowned Loddiges Nursery, which had overseen the creation of the arboretum and rosarium closed, and over coming decades the cemetery was increasingly run as little more than a commercial burial ground.

By the 1930s there were press reports of mismanagement and of overcrowding of grave plots in a desperate effort by the cemetery company to boost its income. With less space for new graves there was diminishing revenue and staff began to be laid off. In the 1950s further deterioration occurred as the joint-stock company struggled to raise enough money for basic maintenance of the site and by the 1960s the company had become “absorbed into a complex of holding companies and no longer possessed independent existence” (Joyce, 1994, page 62). The site had now become heavily overgrown with towering stands of ash, poplar, and other trees, along with a dense ground cover of brambles and ivy. “Through years of neglect”, writes Paul Joyce, “the dense overgrowth of vegetation had at last rendered extensive inner sections of the cemetery impassable, but almost everywhere nature ran out of control, intensifying the atmosphere of advanced romantic decay” (1994, page 63). Finally, in 1972 the company completely abandoned the site altogether which then fell into rapid disrepair: extensive vandalism of tombs, including the scattering of human remains from the catacombs, provoked public indignation along with rumours of occult practices at night (Joyce, 1994). In response to the perceived crisis a voluntary association called Save Abney Park Cemetery was created in 1974, which eventually persuaded the London Borough of Hackney to take municipal ownership of the site, which they did for the nominal sum of £1 in 1979. The association then successfully campaigned for an English Heritage designation of the site as a Historic Park and Garden along with a Grade 2 architectural listing for the ruined chapel and the ‘Egyptian revival’-style main entrance. Under municipal control in the 1980s a series of improvements was carried out to secure the boundary walls, manage dead and dying trees, and clear overgrown pathways. And in 1991 its management passed to a new entity, the Abney Park Cemetery Trust, which now runs the site on behalf of the municipal authority.

At the height of its neglect very few people entered the cemetery: the police, for example, did not bother to patrol the site at all in the late 1970s.⁽⁴⁾ Over time, however, the park has attracted increasing interest from artists, writers, photographers, and others who revel in its mysterious atmosphere of advanced dilapidation and decay. The cemetery has been described as a ‘gothic wilderness’ by the writer Iain Sinclair and is now regularly used as a location

⁽²⁾ Director of the Institute for Urban Ecology, Technical University, Berlin, discussion with the author, 26 April 2011.

⁽³⁾ On the history and design of cemeteries see, for example, George Chadwick (1966), Richard Etlin (1983), and Harold Mytum (1989).

⁽⁴⁾ Paul Richards, former police officer at Stoke Newington Police Station, now working in the field of criminology and GIS, interview with the author, 10 May 2011.

for drama and film making.⁽⁵⁾ For Sinclair, and many other local residents, Abney Park is a tranquil and enigmatic oasis that has somehow escaped the wider transformation of its increasingly expensive neighbourhood and which connects with an earlier and less ordered metropolis. Sinclair's interest in anomalous or unusual places finds resonance with the nature writing of Richard Mabey—who has extolled a fascination with urban wastelands since the early 1970s—and with the architectonic imagination of J G Ballard, Luc Lévesque, and other explorers of urban interstices.⁽⁶⁾

In the early 1990s the ecological significance of Abney Park was officially acknowledged for the first time and the site was designated as the first statutory Local Nature Reserve in the London Borough of Hackney. It is now recognized as one of the most important sites for biodiversity in London with over 170 species of trees and shrubs including some rare trees dating from the original Loddiges planting scheme of 1840. The reserve is nationally important for fungi (the saprophytic gloom of the cemetery provides an ideal habitat), rare beetles thrive on rotting wood, a remnant fauna of moths and butterflies persists (the site has never been built on), and the woodland resounds to the sound of owls, woodpeckers, and other birds.⁽⁷⁾

In addition to its role as a nature reserve the cemetery has also become an internationally recognized site for cruising by gay men. Recent eulogies highlight the attractions of “homo cruising amongst the dead” and the site has been incorporated into “cruising tours, promoting the homosexual use of public space”.⁽⁸⁾ The Not for Tourists website now describes Abney Park quite accurately as a “cemetery/nature reserve/cruising zone” as if to underline its multiple uses in a matter-of-fact way.⁽⁹⁾ The notoriety of the site for cruising, however, has provoked periodic criticisms and has been linked with wider concerns about graffiti, litter, and public drinking. “Most lingering in the cemetery today”, writes Peter Conchie (1997), “takes the form of malingering, the area being, like many wooded burial grounds in London, a minor-cruising ground inhabited by members of the cider-drinking fraternity.” Conchie invokes the spectre of marginal space as a ‘gathering ground’ for undesirable people and practices. Yet, many parks, squares, and nature reserves in London have always been significant sites for sexual activity, not only for cruising by gay men but also for heterosexual couples, sex workers, and others. There is an innate connection between public space and sex, which has always existed in tension with the controlling discourses of urban design (see Betsky, 1997; Brown, 2007; Howell, 2009; Hubbard, 2001; Ingram, 1997). For some local residents, however, Abney Park has become a symbol of neighbourhood decline and the appropriation of the neighbourhood by others: its ‘unkempt’ character evokes a sense of cultural loss and disorientation or acts as a spur for “resentful Englishness” (see Brah, 1999, page 23). Yet at the same time, the park has remained significantly unchanged as a cultural redoubt that connects with an earlier Stoke Newington of squats, political radicalism, and a ‘safe haven’ for outsiders.⁽¹⁰⁾

⁽⁵⁾ Iain Sinclair, speaking at the Stoke Newington Literary Festival, 6 June 2010.

⁽⁶⁾ Recent works which explore the cultural and material aspects of ‘waste spaces’ or other interstitial spaces include Luc Lévesque (2009), Richard Mabey, (2010), and Patrick Wright (1991).

⁽⁷⁾ Some records are currently held by the Abney Park Trust whilst other data are held by Greenspace Information for Greater London and the London Wildlife Trust. Further species lists are held by local experts working in specific fields such as arboriculture, botany, and mycology. The management of the site for biodiversity has been somewhat haphazard, however, and recent losses include the bullfinch, *Pyrrhula pyrrhula*, the common treecreeper, *Certhia familiaris*, and the lesser-spotted woodpecker, *Picoides minor*. On the management of naturally regenerating woodlands in London cemeteries see Marcus Zisenis (1996).

⁽⁸⁾ <http://andreasangelidakis.blogspot.com/2007/08/homo-cruising-amongst-dead.html>

⁽⁹⁾ <http://www.notfortourists.com/hood.aspx/london/stokenewingtoneast>

⁽¹⁰⁾ In the 1970s one of London's largest lesbian communities developed along with the UK's only urban terrorist organization, the Angry Brigade [see Sinclair (2009) and see also local blogs such as <http://hackneyhistory.wordpress.com>].

In this paper I want to explore some possible lines of intersection between the ecological and sexual significance of marginal urban spaces in order to develop the conceptual terrain of ‘queer ecology’. I begin with an exploration of the connections between the queering of space and the formation of urban heterotopias. We then consider possible ways in which urban ecology, and in particular urban political ecology, might be enriched through a ‘queering’ of its analytical frameworks. Finally, we examine the prospects for ‘heterotopic alliances’ emerging from specific cultural and scientific responses to urban nature that challenge the implicit utilitarianism and ‘new morality’ of urban public space.

2 Queer space and green space

For the architectural historian Aaron Betsky (1995, page 201) ‘queer space’ is “a space of difference”, an arena of doubt, self-criticism, and “the possibility of liberation”. Although Betsky roots the idea of queer space in alternative histories of architectural design he nevertheless opens up the concept to a wider field of interpretation for rereading the intersections between sexuality and space. Yet, the idea of ‘queer space’ should not be elided with queer theory, as Natalie Oswin suggests (2008, page 90), since it remains rooted in a restricted conception of identity formation that privileges reified forms of sexual difference as the basis for political action. Oswin argues instead for a “queer approach to space” (page 91) that extends to a more complex and interdisciplinary set of elements beyond the mere appropriation of space. But how might this ‘queer approach to space’ relate to urban nature? And if so, what kind of materialities or cultural constellations might be illuminated?

Contemporary parks, cemeteries, and other ‘green spaces’ reveal a spectrum of cultural responses to urban nature ranging from the spontaneous appropriation of marginal sites to the controlling and historicist discourses of heritage preservation. In Abney Park, for example, ecological concerns are in tension with heritage-based understandings of the site that focus on the past yet ironically downplay the radical and nonconformist aspects of the site’s history.⁽¹¹⁾ The cultures of nature within the park now comprise several elements: a ‘nature of contemplation’ produced through direct encounters with nature ranging from vernacular delight to contemporary forms of didacticism and scientific practice; a ‘queered nature’ derived from the appropriation and rereading of marginal space; a late-modern variant of ‘*rus in urbe*’ exemplified by the presence of ‘wild urban woodlands’ that rework urban–rural distinctions both ecologically—through their high biodiversity—and also symbolically by challenging cultural understandings of urban and industrial landscapes; and a ‘contested nature’ caught between what the Italian architect Antonella Contin terms the ‘techno-pastoral’ of architectural heritage and newly emerging discourses of urban ecology that emphasize the preeminence of biodiversity.⁽¹²⁾

Heritage discourse provides a significant challenge to both the queering of space and the ecological defence of ‘wild urban nature’ through its ideological emphasis on the reordering and surveillance of space in the service of a heteronormative reading of public culture. In London, for example, the period since the mid-1990s has seen the remodelling of several central London squares to remove shrubby undergrowth in order to create a more formal look but at the same time restrict opportunities for public sex behind a patina of heritage-oriented design (see Andersson, 2011a; Doron, 2001; 2002). The assault on ‘wild urban spaces’ is furthered through the installation of CCTV, brighter lighting, and other measures to control

⁽¹¹⁾This point has been made by members of the Hackney Environment Network in a series of discussions with the author. Issues related to the site have also been raised at meetings of the Hackney Biodiversity Partnership, which the author has attended since 2010.

⁽¹²⁾The term ‘techno-pastoral’ was used in relation to architectural heritage discourse by Contin at a seminar to accompany the launch of David Grahame Shane’s book *Urban Design Since 1945* (2011) held in London on 15 April 2011. For studies of novel ecological assemblages, including the significance of wild urban woodlands, see Ingo Kowarik and Stefan Körner (2005).

the social composition and comportment of visitors. These measures are also antithetical to urban wildlife: brighter lighting, for example, has a deleterious effect on bats, moths, and other night-flying insects; and the removal of shrubs restricts breeding sites for birds and small mammals (Longcore and Rich, 2004). The presence of ‘wild urban nature’—the ecological dynamic of secondary succession—lies in tension with a ‘secondary enlightenment’ of the contemporary metropolis: the enhanced illumination of the late-modern city, with its billboards and an ever more brightly lit quasi-public realm, including sporting complexes and other icons of urban redevelopment, is not only deleterious to nature but forms part of an expanding luminescence of surveillance and display.

The recent impetus towards ‘tidying up’ public spaces in London, New York, and elsewhere can be linked to specific conceptions of morality and public culture: a development that gained particular momentum in New York City under the Giuliani administration of the 1990s (see Andersson, 2011b). We know, however, that cultures of public sex have long flourished in modern cities, as reflected in histories of state harassment (see Houlbrook, 2005; Ingram, 2010). In Abney Park, however, there is no evidence of police control of cruising activity in the past when this was widespread elsewhere in London, yet whether this is due to lack of interest in the site either by the police or gay men is uncertain.⁽¹³⁾ Since the 1990s, the Abney Park Trust, which manages the park, has been quite relaxed about the cemetery’s popularity for cruising unlike many other examples of public space in London where measures have been undertaken specifically to discourage cruising activities.⁽¹⁴⁾ Whether such an approach would survive the mooted refurbishment of the park is open to question since public consultation might begin to coalesce around behavioural and anticrime issues rather than around historical, ecological, or, indeed, political aspects of the park’s significance.

The relationship between parks and their immediate locales reveals the “ideology of the neighbourhood” as a powerfully exclusionary form of communitarian politics (Berlant and Warner, 1998, page 563). The location of Abney Park within one of the London boroughs adjacent to the 2012 Olympics site also engenders a particular discourse of urban design as bourgeois spectacle within which ‘wild urban nature’ or neo-Gothic romanticism has no place.⁽¹⁵⁾ Formerly socially mixed streets surrounding the park have also become progressively gentrified since the mid-1990s so that potential impacts on property values have become more closely imbricated with local planning discourse. And across East London more generally, in the wake of the Olympics redevelopment, there has been an intensified impetus towards the utilization of marginal spaces and ‘tidying up’ urban nature.

Parks can be considered ‘heteronormative’ in the sense that these spaces reflect the “hierarchies of property and propriety” that are extent in wider society (Berlant and Warner, 1998, page 548). Many London squares, for example, remain accessible only to ‘keyholders’, and there has been conflict since the 18th century over widening access to parks, squares, and other open spaces in London (Lawrence, 1993). Like many urban cemeteries, however, Abney Park has a more attenuated relationship with its nearby residents than formal parks or squares, with houses backing onto the perimeter walls rather than looking towards the site itself, unlike neighbouring Clissold Park, which has been the focus of a flurry of redevelopment activity.

Public discourse in relation to cruising activity frequently segues into a fear of crime or social disorder more generally. The association between crime, danger, and the sexual use of public space is, however, much more complex than moral discourses of urban regeneration suggest.

⁽¹³⁾ Paul Richards, interview with the author, 10 May 2011. Gina Rackley, local mycologist with over thirty years experience of Abney Park, suggests that the cemetery was simply too overgrown in the late 1970s to facilitate cruising activity (site visit with the author, 3 July 2011).

⁽¹⁴⁾ Anna Smale, Abney Park Visitor Centre, interview with the author, 4 October 2010.

⁽¹⁵⁾ See the art of Lara Almarcegui or the writings of Sinclair, respectively.

The question of safety raises distinctions between ‘technical surveillance’ and ‘natural surveillance’ in the sense that the mere presence of people renders public spaces safer. The idea of ‘natural surveillance’ does not just encompass the oversight of property but may extend to a broader sense of urbanity as a liberal arena of benign human presence as William H Whyte, Richard Sennett, and others have suggested. In Abney Park, for example, cruising by gay men actually makes the site safer for lone walkers and others since the space is rarely empty, even at night. There is a subtle choreography of interaction and noninteraction reminiscent of China Miéville’s novel *The City and the City* (2009), where different urban worlds are separate yet coterminous: preoccupied ecologists and bare-chested cruisers pass each other on the winding paths of Abney Park as if stepping through different worlds.

Sex in public spaces raises issues of social inequality and cultural repression: for many gay or bisexual men it is a means of escape from social mores and it includes those who are excluded from participation in the commercial entertainment scene on the grounds of age, appearance, ethnicity, poverty, or other factors. Indeed, significant numbers of cruisers in Abney Park include men who would not ordinarily identify themselves as gay but would fall into a different category—as deployed in public health research—of ‘men who have sex with men’. In particular, Abney Park appears to be a favoured cruising ground for local men from Turkish and Kurdish backgrounds who are largely disconnected from lesbian and gay culture.⁽¹⁶⁾ There is, then, an equity dimension to public sex that is rarely acknowledged and which reveals the analytical and political limitations to a restricted reading of sexuality and space. These observations also suggest that ‘assimilationist’ approaches to gay culture and sexual normativity may work to reinforce class and race-based inequalities (see Bell and Binnie, 2004; Oswin, 2008). The presence of ‘queer space’ in this context is internally differentiated through the heterogeneity of its users but is also connected with multiple structures of power that transcend binary or simplistic classifications of sexual identity or the privileging of sexual identities over other categories of difference.

3 Rethinking heterotopias

If we consider that sexuality can be site-specific this provides a powerful conceptual link with Michel Foucault’s reading of the heterotopia. In his original lecture on heterotopias, delivered in 1967, Foucault highlights “the curious heterotopia of the cemetery” (1998 [1984], page 180), which, along with other specific examples such as gardens, prisons, and ships, becomes not only an axiomatic space of difference but also a radical inversion of other sites.⁽¹⁷⁾ Unlike utopias, suggests Foucault, the heterotopia has a material presence as a ‘real place’ that is marked by a ‘mixed’ or *mitoyenne* (joint) experience. He considers the implications of a shift in cemetery location during the 19th century from the centre of the city to the outskirts of the city—“la limite extérieure des villes”—that marked the edge of the expanding 19th-century metropolis.⁽¹⁸⁾ In London this shift in cemetery location was instituted by new legislation in 1836 for the establishment of new cemeteries outside the

⁽¹⁶⁾Field observations by the author corroborated by personal communications with Johan Andersson and Foteini Mamali. On issues of race, class, and public sex, see also Gavin Brown (2004), Carol Reisen, Maria Cecilia Zea, Fernanda Bianchi, and Paul Poppen (2011); and Vicki Strange, Chris Bonnell, and Elaine Barnett-Page (2004). As George Chauncey (1994, page 179) has argued in relation to the history of gay men in early-20th-century New York, “privacy could only be had in public” (see also Hollister, 1999; Humphreys, 1999 [1975]). On ‘cemetery sex’ see also Deering (2010).

⁽¹⁷⁾The essay “Different spaces” (1998) is derived from a lecture given to the conference *Cercle d’études architecturales* in March 1967, which was eventually published in the journal *Architecture, Mouvement, Continuité* in 1984. For differing assessments of the conceptual and political utility of the term ‘heterotopia’ see David Harvey (2000) and Kevin Hetherington (1997).

⁽¹⁸⁾The original section of text reads: “En tout cas, c’est à partir du XIXe siècle que chacun a eu droit à sa petite boîte pour sa petite décomposition personnelle; mais, d’autre part, c’est à partir du XIXe siècle seulement que l’on a commencé à mettre les cimetières à la limite extérieure des villes.”

core of the metropolis (see Arnold, 2006; Meller and Parsons, 2008). This relegation of death from the city centre was driven by early public health fears of contagion and also by a more subtle set of developments associated with a more distanced, individualized, and bourgeois attitude towards death (see Ariès, 1974). As a result of these changes, the space of the cemetery itself takes on a different relationship with the city: it becomes marginalized in relation to the centre of the city but at the same time adopts a more complex set of social and cultural roles. If for Foucault the heterotopia is marked by a coterminous juxtaposition of incompatible elements then this paper reads this dimension somewhat differently by emphasizing how the material characteristics of specific places might engender ostensibly disparate or heterotopic alliances, with political implications for the use and meaning of urban space. In the case of Abney Park the site has heterotopic qualities not just from its role as a cemetery but also from its original design as an arboretum and landscaped garden since gardens and zoological (or botanical) gardens, in particular, mark a key characteristic of heterotopic space as the *microcosme*.⁽¹⁹⁾

Cemeteries also have an additional characteristic of the archetypal heterotopia: that is, the presence of heterochrony or disruption of standardized time since the dead are outside of time, relegated to what Foucault terms a *quasi éternité*. We could add that moments of ecological rapture or public sex introduce the element of *absolument chroniques* (absolute time) of the here and now, which is different from the more mundane or regulated temporal experience of modernity. The sense of stilled time experienced through encounters with gardens, cemeteries, or nature itself links with modes of sensory experience that heighten not only the experience of the present but also an existential awareness of human finitude. “The incandescence of life means death; death means an incandescence of life”, writes Georges Bataille (1962 [1957], page 240), who perceives eroticism in its broadest sense to be an affirmation of life.

The heterochrony of public space links with site-specific aspects to sexuality and little understood aspects to nocturnal public culture.⁽²⁰⁾ An expanded notion of public sex also reveals limitations in the understanding of heterosexualities that lie outside the current scope of queer scholarship or outside the scope of the social sciences more generally (see Hubbard, 2000; Philips and Reay, 2002). The topography of the urban landscape is intricately entwined with the extent and possibility of public sex so that the distinction between ‘queer space’ and other kinds of sexual spaces becomes diffuse, multilayered, and indefinable.

If we conceive of urban nature, whether the microspaces of balconies or more extensive urban forests, as a particular kind of heterotopic space then this suggests a point of conceptual intersection with queer theory as a marker of spatial disorder. In this sense, the term ‘queer’ is invoked spatially on the basis of unclassifiable difference or marginality rather than in terms of sexuality itself. If we take the cemetery to be an example of a heterotopia, we find that it does not reproduce society directly except in a more attenuated sense as a space of contemplation or repose (notwithstanding Foucault’s distinction between ‘idleness’ and ‘leisure’): a seemingly moribund space such as a neglected urban cemetery is interesting in this respect since it represents an island within the city that is partially separated in ecological, cultural, and political terms. Whereas designed spaces such as parks may inflate land values and contribute towards urban speculation, anomalous spaces such as cemeteries have more complex and uncertain relationships with surrounding land and property values.

The significance of urban heterotopias is also heightened by the retreat since the 1960s from design-based utopias. The presence of nondesign or spontaneous elements within urban space begins to acquire greater material and conceptual significance as part of a wider reassessment of the contradictions and limitations to modernism as a progressive

⁽¹⁹⁾ See also Chris Steyaert (2010, page 57), who notes that the term ‘queer’ is inherently heterotopic.

⁽²⁰⁾ On the city at night see, for example, Anne Cauquelin (1977), Sukhdev Sandhu (2006), Joachim Schlör (1998), and Burkhard Schnepel and Eyal Ben-Ari (2005).

social and political project. The Italian architectural historian Manfredo Tafuri, for example, writing in the early 1970s, detects an “atmosphere of anxiety” and ideological confusion over the function of architecture and design in the modern city (1976[1973], page 176). Tafuri anticipates an emerging emphasis on ‘real spaces’ in architectural discourse as opposed to the increasingly remote schema of 20th-century modernism; similarly, in anthropology, urban sociology, and other cognate fields we find an increasing focus on vernacular or grassroots forms of urbanism (see Berman, 1982; Castells, 1983). This is not to suggest an inherent contradiction between 20th-century modernism and urban nature but rather to redirect our focus towards experimental spaces in the city and at the same time initiate a more nuanced engagement with modernity itself. There is an ambivalence running through the relationship between modernity and sexuality that encompasses both the biopolitics of the body in terms of intensified categorization and control and successive countercurrents marked by the assertiveness of the modern sexual subject.

The queering of space also shares a conceptual affinity with *terrain vague* and the cultural recognition of anomalous, marginal, and unclassifiable spaces (see de Solà-Morales Rubió, 1993). The term *terrain vague* encompasses ‘unruly’ ecological assemblages such as ruderal sites (created through clearance, demolition, or other forms of destruction) and anomalous spaces such as the sides of railway lines, roadside verges, or other elements of the urban landscape. Wild urban spaces outside of formal parks and gardens generally fall into this category of *terrain vague* along with a plethora of interstitial spaces such as alleys, rooftops, and other partially obscured or neglected fragments of the urban landscape. ‘Unruly spaces’ can be defined as those that do not play a clearly defined role, or which are characterized by ill-defined use or ownership, or that have been appropriated for uses other than those for which they were originally intended such as the rooftop choreography of Trisha Brown in the early 1970s, the spread of skateboarding culture in the 1980s, or the more recent phenomenon of *parkour* or ‘free running’. Activities such as cruising connect with these other forms of social and cultural practice as forms of site-specific spatial insurgency: they represent a series of arenas within which human creativity and the sexual imagination are radically combined.

4 Queering urban ecology

In order to develop an argument about the possible connections between queer theory and urban ecology we need to clarify what is encompassed by these seemingly disparate fields. The term ‘queer theory’, first deployed (and then rejected) by Teresa de Lauretis in the early 1990s, has subsequently expanded its meaning to encompass an increasingly wide range of developments.⁽²¹⁾ At least four interrelated dimensions stand out: firstly, the deconstruction of sexual norms and categories associated with the bounded, regulated, and knowable human subject; secondly, the emerging activist agendas of the post-Stonewall era; thirdly, the critical reappropriation of the term ‘queer’ itself; and, fourthly, demands to widen the scope, methods, and analytical sensitivity of academic research into cultural, historical, and geographical aspects of human sexuality. Although some scholars such as de Lauretis have been concerned with queer theory’s lack of conceptual precision, others retain the term ‘queer’ on the very basis of its lack of fixity.⁽²²⁾ In particular, the conceptual terrain of queer theory is now being extended towards a wider reassessment of human identity and sexuality altogether and has evolved into much more than a critique of heteronormativity. As Oswin (2008, page 90) argues, a queering of social theory “goes beyond a sexual politics of recognition” to encompass other fields such as feminism, materialism, and postcolonialism.

⁽²¹⁾ Compare, for example, de Lauretis’s essay of 1991 with that of 1994.

⁽²²⁾ See, for example, Berlant and Warner (1998), Butler (2004), Chisholm, (2002; 2005), Halberstam (2005), Jagose (1996), Muñoz (2009), Sullivan (2003). Aspects of queer theory involve a greater degree of continuity with earlier studies of human sexuality than is widely recognized. See, for example, Eric Weitz (2007) on research in Weimar-era Berlin.

Similarly, Kath Browne (2006, page 888) proposes ‘queer’ “not as a simplistically appropriated identity category, but as a fluid set of possibilities and contestations” and calls for a “broader inter-disciplinary queer theory” (page 891). But how might an expanded reading of queer theory intersect with urban ecology?

Urban ecology, *sensu stricto*, as practised by ecologists and other natural scientists, emerged in the 1960s and 1970s, though there have been earlier small-scale studies of urban nature especially in European cities (see Sukopp, 2002). The emphasis on novel forms of urban nature disrupted phytogeographical traditions of landscape classification and interpretation as the study of urban sites emphasized the role of neophytes (introduced or adventitious species), novel biotopes, and unpredictable socioecological dynamics (Lachmund, 2003). Recent developments in urban ecology have challenged nativist or historicist landscape idioms such as ‘ecological restoration’, which find their cultural corollary in the retro-projections of heritage discourse and the recreation of imaginary vistas. Yet urban ecology remains a disparate body of work ranging from conceptions of urban nature as “a degenerate version of adjacent rural ecosystems” to perspectives that recognize the “intrinsic worth” of urban ecosystems and novel species assemblages (see Hitchmough and Dunnett, 2004, page 13).

A further set of distinctions within urban ecology can be made in terms of epistemological approaches used to include human influence on ecological systems. Attempts to incorporate history within ecology, for example, reveal that human ecology in its broadest sense has tended to focus on relatively isolated or premodern societies and has struggled to extend coherent insights to contemporary societies as the recent symposium in the journal *Cartographica* attests (see Rose-Redwood, 2010).⁽²³⁾ Ecological studies of urbanization have generally been reliant on various analogies or metaphors drawn from the natural sciences with little analysis of the social or political dynamics of the urban process itself. This epistemological impasse within urban ecology has been redressed to some degree by the development of urban political ecology in the 1990s, which has deployed a neo-Marxian framework for the study of urban nature and the socioecological dynamics of capitalist urbanization (see Heynen et al, 2006). There are, however, some difficulties with what might be termed the ‘first wave’ of urban political ecology including an overly deterministic emphasis on the production and meaning of urban nature, and in some cases, weakly conceptualized readings of nature itself. These limitations have been partially addressed by more recent engagements with posthumanist ontologies of political activism and the human subject, new understandings of disease epidemiology and the corporeal dimensions to the production of nature, and the extension of analytical approaches derived from political ecology to a wider range of contexts or instances (see, for example, Gissen, 2009; Perkins, 2007; Zitouni, 2010).

If we link urban ecology with posthumanist insights, there are clear points of interconnection such as network-oriented ontologies of human subjectivity, extended conceptions of agency, and also greater acknowledgement of the intrinsic worth of nature itself (see Hinchliffe et al, 2005; Wolch, 2002). Thus far, however, the development of theoretical connections between ecology and queer theory has been quite limited. Catriona Mortimer-Sandilands (2005, page 1) has called for “a ‘queer ecological’ sensibility” which rests on a series of metaphorical elisions between wounded bodies and landscapes in the context of HIV/AIDS. Her argument is derived from an elaboration of ecofeminist readings of nature to suggest that a ‘queer’ reading of environmental degradation finds resonance with the political experience of lesbian and gay communities (see also Mortimer-Sandilands, 2010). Yet Mortimer-Sandilands’s reading of the term ‘queer’ is restricted by her insistence on its connection with

⁽²³⁾The *Cartographica* symposium is devoted to Eric Sanderson’s *Mannahatta* project, which in many respects exemplifies contemporary problems with using an ‘ecological’ approach to understand urban change through the misapplication of methods and metaphors drawn from the natural sciences (Sanderson, 2009).

specific sexual subjectivities rather than a term with wider conceptual or epistemological implications. In a similar vein, from the field of literary criticism, Simon Estok (2009, page 214) introduces 'queer ecocriticism' on the pretext that "the commodification of nature and sexual minorities are similar, each depending on a large consumer base that seeks a vicarious experience, rather than the thing itself." Drawing parallels with the environmental justice movement, Estok suggests that "queer ecocriticism voices 'Nature'" as well as "silenced communities" (page 12) and contrasts utilitarian approaches to nature with the extension of ethical consideration to 'nonsentient entities'. More productively, Estok introduces the term 'ecophobia', which may provide some conceptual connections between anxieties provoked by 'wild urban nature' and a lack of control over public space.

From a different angle, the landscape ecologist Gordon Brent Ingram (2010, page 254) has used the term 'queer ecology' in relation to the appropriation of space by marginalized groups and calls for the "queering of landscape ecology". In this sense Ingram seeks to extend the meaning of 'queer space', as a form of social and political appropriation, to include a close reading of its ecological dynamics. His approach combines several elements: the borrowing of metaphors from ecological science such as 'patch' and 'edge' in order to explore the site-specific aspects of sexual subcultures; a challenge to heteronormative readings of nature; and a queering of environmental history and landscape ecology. Ingram uses the example of an urban park in Vancouver to consider what kind of landscape can support "consensual intimacy" and play a role in building social networks (page 255) and combines insights from the ecological and social sciences with an "eroticized cultural studies" in order to develop a "more nuanced understanding of sexual subcultures" (page 256). He develops a dialectical reading of landscape and urban subcultures over several decades in Vancouver to reveal the "remarkable network of public spaces, often in or near relatively secluded forested parklands, that allowed a range of sexual networks and politicized subcultures to express themselves erotically and to coalesce into the beginnings of self-defined networks and communities" (page 258). In the case of Vancouver he suggests that this "landscape ecology of urban activism" has been rooted in "shifting spaces for human intimacies and sites of resistance to avoid police harassment" (page 277). He suggests that no study has yet satisfactorily linked landscape ecology with issues of gender and sexuality, but his analysis rests on a rather narrow definition of 'landscape' as a field of research. Ingram's approach raises epistemological difficulties in terms of analytical and etymological continuities with earlier variants of 'urban ecology': the analogy he draws between bioecology and human ecology through the discipline of landscape ecology (via the work of Zev Naveh and others) does not translate easily into the cultural analysis of urban landscapes. Interestingly, Ingram (2010) raises the possibility of linking landscape ecology with site-specific understandings of human sexuality by building on studies of disease epidemiology and sexual violence. In a similar vein Darren Patrick (2010) explores possible intersections between queer theory and analytical insights into the production of urban nature. Patrick draws an analogy between queer theory's deconstruction of gender and sexuality and the parallel theoretical task of unravelling the city-nature nexus. By using the New York City waterfront as an example he raises the possibility of a theoretical synthesis between queer theory and urban political ecology in order to anchor the queering of urban studies in the material analysis of urban nature.

What are the political implications of queering urban nature? By moving analysis beyond queer space as a politics of spatial appropriation towards an enriched engagement with the complexity of urban nature itself we may be opening up hitherto unnoticed lines of dialogue and intersection. In particular, we may begin to bring some of the political dimensions of urban ecology into closer alignment with the cultural and material complexities of urban space.

5 Heterotopic alliances

By identifying common interests in the protection of urban nature, we can find connections between the liberatory or experimental characteristics of heterotopic space and Henri Lefebvre's original conception of the 'right to the city', which is rooted in ideals of citizenship that transcend property rights. Building on the Lefebvrian inspired rights-to-the-city discourse, for example, Mortimer-Sandilands (2005, page 22, original emphasis) sees "public gay sex as a sort of *democratization* of natural space" through the making of corporeal claims on space. Similarly, Gavin Brown (2004) finds parallels between cruising and other examples of political action aimed at 'taking back' public space. Interestingly, Lefebvre also uses the term 'heterotopia', but in a different sense to that of Foucault, in order to emphasize "places that are other" or at least spatially or socially disordered (see Elden, 2009, page 330). "Heterotopy", writes Lefebvre, is "the other place, the place of the other, simultaneously excluded and interwoven", which he locates historically in the antinomy between the urban and the rural (2003[1970], page 129). Crucially, for Lefebvre, the urbanization of the countryside under modernity involves a greater ubiquity in the heterotopic qualities of space, which acquires an increasingly mixed or ambiguous character (see also Lefebvre, 1970). By augmenting Lefebvre's somewhat restrictive definition of the heterotopia to provide a conceptual lineage between Foucault and Lefebvre, we can begin to sketch a workable definition of what a heterotopic alliance might be like in practice.

Existing heterotopic alliances are rare, however, apart from some limited examples of parallel concerns over the protection of waste ground from development. In Berlin, for example, the clearance of vegetation from the Lützowplatz in 1978 provoked protests from both ecologists and sex workers. In this instance a site of significance for botanical fieldwork became entwined in a larger set of arguments about the rights to urban space and also marked the growing politicization of urban ecology as a discipline oriented towards the protection of marginal landscapes within the city (Lachmund, 2003). Urban nature reserves in London and elsewhere have often become significant sites for cruising and sexual encounters between strangers yet this mutual use of space has not evolved into any kind of sustained political dialogue. The journalist Patrick Barkham (2010, page 64), for example, describes an encounter with cruisers while searching for butterflies in abandoned gravel pits now turned into a nature reserve in West London. "I was relieved that Londoners are so famously incurious", writes Barkham. "No one glanced at me, let alone asked me what I was doing even though I was behaving weirdly." Barkham's experience of mutual indifference evokes the blasé outlook of Georg Simmel's Berlin as well as Jonathan Raban's London, where "to live in a city is to live in a community of people who are strangers to each other" (Raban, 1974, page 15).

The step from social indifference and the coterminous use of space towards new forms of political awareness might begin to emerge from an expanded understanding of nature itself. The conjunction of sexuality with nature poses the challenge of the naturalization of sexuality so that ideologies of ecology, evolutionary biology, and other fields come into play. The recent emphasis on 'biological exuberance', for example, advanced by Bruce Bagemihl, dispels narrowly anthropocentric and heteronormative readings of the natural world, and "dissolves binary oppositions, uniting dualities whilst simultaneously cherishing unlikeness" (1999, page 262). Similarly, Diane Chisholm draws connections between the sexuality of nature and the philosophical insights of 'vitalism'—the ubiquity of sexual energy in nature—that underlies the significance of Gilles Deleuze and Félix Guattari's 'anti-Oedipal' insistence on the ubiquity of desire (Chisholm, 2010, page 363). In *Expressionism in Philosophy*, for example, Deleuze draws on the work of Spinoza to emphasize 'joyful passions' as a leap of connection with external stimuli yet the ephemerality of such heightened moments of existence also contains a certain melancholy (Deleuze, 1992 [1968]; see also Machery, 1996). The development of an expanded understanding of the relationship between nature (or the force of life itself) and the diversity of both human and nonhuman sexualities also disrupts

the prevalent (Freudian–Lacanian) model of the unconscious” with its restrictive notion of sexual normativity (Åsdam, 1995, page 5). By effectively inverting the naturalization of sexuality that resides in ideologies of nature, a positive reading of the diversity and ubiquity of human sexuality can be differentiated from psychoanalytic preoccupations with pathological or repressed manifestations of desire.

For Betsky (1997, page 147) cruising represents an “escape into a material reality” but it also challenges the notion of the omniscient human subject: there is an unpredictability and multiple causality that blurs cultural or corporeal distinctions. The dynamics of cruising link with a posthumanist ontology of desire that disturbs bounded conceptions of the human subject or conventional readings of sexuality. If cruising is understood as a complex interplay between bodies and space then a queer reading of space reveals a distributed agency of desire that extends beyond individual or even multiple human bodies to incorporate nonhuman nature, inanimate objects, surfaces, and smells (see Brown, 2008). We can introduce Karen Barad’s ‘agential realism’ here to enable a “queering of queer conceptions of causality and agency” to produce new kinds of material entanglements (2008, page 313; see also Bennett, 2010). The ‘sexual body’ is no longer one human subject but an array of different elements that dispels any attachment to ‘residual humanism’ (Colebrook, 2009, page 11). For Barad the material world is comprised of configurations and potentialities, and these phenomena must be understood not only in their own specific context but also in relation to the intentionality and power relations of knowledge construction itself. She develops an expanded notion of agency as ‘intra-active involvement’ but this is not derived from an undifferentiated elision of human and nonhuman forms of agency. The elucidation of “nature within nature” provides a critical dimension to an interdisciplinary account of the nature–culture nexus that seeks to take biophysical dimensions of causality seriously (see Rouse, 2004, page 157). As the nature of materiality is disentangled from issues of language or representation, we find that “agency is cut loose from its traditional humanist orbit” (Barad, 2003, page 826).

In what ways does the agency of nonhuman nature intersect with human sexuality? Some nature writers describe a sense of erotic delight in nature, drawing rhizomatic analogies between the structure and dynamics of plant growth, for example, and the complexity of human sexuality (see Chisholm, 2010). The direct experience of nature, as opposed to its digital or televisual simulacrum, carries an erotic charge that connects with a corporeal or neophenomenological understanding of reality in contrast to a flight into the unconscious (see Foster, 1996). The revelation of nature itself—the ‘botanical imagination’ transposed to an urban setting—shares an affinity with a search for sexual authenticity outside the strictures of sexual normativity and its digital avatars.

What though are the ideological implications of an eroticized reading of nature and landscape? The cultural depiction of the body in nature—principally through art and literature—presents an ambivalent relationship between gender, sexuality, and landscape. The pastoral genre, for example, which has been an inspiration for much park design, is rooted in the reconstruction of idealized fragments of nature. The pastoral landscape is marked by an emphasis on the search for sensual authenticity in nature through the invocation of an imaginary space that lies outside of history. Yet this pastoral ‘state of innocence’ is also sexually ambivalent within the Judeo-Christian tradition and has been a long-standing literary genre for homoeroticism: we find classical examples in the poetry of Catullus, Sappho, and Virgil amongst others, whilst 19th-century illustrations include Thoreau, Verlaine, and Whitman (see Coote, 1986 [1983]). For Mortimer-Sandilands (2005), the poetic notion of a natural state of homoeroticism in nature produces a “reverse discourse” from the naturalized dominance of heterosexuality or architectonic preoccupations with the spatial production of deviance. But what is the ideological significance of drawing on the ‘pastoral’, as a specific type of representational practice, in the context of nature, sexuality, and urban space?

If we return to William Empson's influential critique of the pastoral, his argument is not concerned with the idyllic combination of the human figure with nature per se but stems from the social relations implicit in this particular mode of representation. Empson stresses the artificiality of a contrived authenticity in the representation of proletarian or peasant life, whereby the artist or writer adopts a 'double attitude' that extols a certain 'simplicity' or even innocence in their subject matter whilst orienting their work towards a 'superior' audience (1935, page 15). If we transpose Empson's observations to an urban setting, the peasant figure of bourgeois art or literature can be supplanted by the gritty representation of proletarian sexuality in the modern metropolis for an elite audience. The juxtaposition of sexuality with the marginal spaces of the city reveals a tension between an imaginary locus of cultural authenticity and the ideological impetus of uncultivated nature or material decay as a catalyst for desire and corporeal transgression. The recent use of the term 'urban pastoral' raises questions about the intersection between nature, ideology, and the politics of representation in the contemporary city (see Stallabrass, 1999). The inherently conservative idiom of the pastoral, even in its homoerotic guise, should be considered differently from the queering of space as a form of political appropriation (see Shuttleton, 2000).

The naturalization of specific combinations of sexuality and landscape can work in the opposite direction since the modern city has also been the focus of anxieties surrounding the psychological effects of modernity. In the early decades of the 20th century, for example, we find the emergence of concerns with the urban environment as a catalyst for psychological disturbance including sexual deviance where the artificiality or sensory overload of the city was seen as a cause of homosexuality (see Boag, 2003). As recently as the 1960s the doyen of landscape architecture, Ian McHarg, drew on similar arguments using psychological research into the effects of overcrowding to explore what he termed the 'pathology' of the modern city (1992[1969], page 194). The idea of 'moral zones' within the metropolis, which can be traced to the earlier ecological metaphors deployed by the Chicago School, has consistently rested on a misreading of the spatial and political dynamics of urban culture (see Gaissad, 2008). An alternative perspective is provided by the sociologist Henning Bech, who suggests that the gay man is the "prototypical figure *par excellence* in relation to urban life" (Bech, 1998, page 222). In this sense Bech introduces an ironic accentuation of the early-20th-century preoccupation with the effects of urban space on human sexuality by insisting on the presence of an autonomous sexual 'logic' to the modern city that is "not reducible to the factors that constituted it historically or continually help to reconstitute it" (page 218).

An eroticized reading of the urban landscape also links with neo-Gothic settings of urban decay as a stage set for male fantasies: abandoned buildings, disused wharves, and other marginal spaces present a neo-Gothic eroticism that is far removed from everyday reality. In Derek Jarman's film *Last of England* (1987), for example, and many of his other works, a landscape of decay forms the setting for sexual encounters.⁽²⁴⁾ Similarly the German photographer Herbert Tobias, in a series of photographs entitled *Zwei* (1976), depicts an androgynous naked figure standing next to an empty building in a park. For Tobias, abandoned spaces become the setting for a heightened eroticism that reflects a sense of cultural and political displacement in postwar European cities (see Barber, 2002). Whilst Marshall Berman, in discussing the aesthetic and sexual allure of the ruins of the South Bronx, raises the political spectre of a "lover from the ruins", as the imaginary counterpart to sublime landscapes of destruction (1999, page 76). These types of 'male fantasies' can be linked to the assertion of masculinity in nature being transposed to an urban setting, yet they also hold ambiguities that unsettle any simplistic reading of public sex as an inherently political act.

⁽²⁴⁾ John Binnie (2001, page 104), for example, explores the intersections between queer space and "the ruins of the urban landscape" and has written elsewhere of an "urban queer aesthetic" (2004, page 127).

To what extent does male cruising hold a liberatory potential that cuts across gender differences? Is there a commonality of interests between men and women in relation to public sex or does such an agenda actually reinforce the masculinist notion of public space as a “testing ground for power” (Betsky, 1995, page 177)? Evidence from a range of cities shows that subcultural networks that are emerging in relation to public space reflect different patterns of political mobilization between lesbians and gay men (see Durand, 2006; Grésillon, 2000; Ingram, 2010). In London, for example, the geography of sexual subcultures is highly variegated despite historical concentrations of gay men in areas such as Brixton, Clapham, Vauxhall, and Stoke Newington (where Abney Park is located) (Turner, 2003). The idea of public sex is linked with conceptions of the city as a space of illicit encounters and radical transgressions, yet these historical associations have been overwhelmingly male and also extend to more violent or exploitative dimensions of public sex. The principal focus of this paper has been on instances of consensual sex in public space without any overt form of economic exchange but the relationship between sex workers and the configuration of urban space adds an additional layer of complexity to the presence of heterotopic interests or alliances. Similarly, we might reflect on where the ecological limits to ‘wild urban nature’ might lie in terms of contradictory outcomes such as declining biodiversity where sites become completely dominated by fewer species over time, or the political limits to ‘wild urban sex’ involving risky, exploitative, or highly visible practices.

Heterotopic alliances involve or at least imply a coalescence of interests—even if not explicitly acknowledged—between disparate groups or individuals concerned with the defence of marginal or interstitial spaces.⁽²⁵⁾ In this paper we have focused quite specifically on queer ecology as one particular instance of a heterotopic alliance but these types of spatial affinities could be extended to artists, writers, and others with an interest in marginal spaces of urban nature. The idea of a heterotopic alliance contrasts with other forms of grassroots consciousness such as urban social movements since these are marked by a greater degree of internal coherence in terms of aims or organization, more clearly redistributive political agendas, and potentially closer interactions with the state (see Castells, 1983). Equally, a heterotopic alliance is different from other heterogeneous political forms such as the ‘rainbow coalition’ on the basis of its diffuse, ephemeral, and site-specific characteristics.

6 Conclusions

The queering of urban ecology opens up new possibilities for the interpretation of urban nature. There is a conceptual synergy between queer space and urban heterotopias that furthers our understanding of how material spaces are experienced and of how different kinds of cultural or political alliances might emerge in relation to the protection of specific sites. The intersection between queer theory and urban ecology also raises questions in relation to conventional categorizations of urban nature so that distinctions between design and ‘nondesign’ become unclear, the connection between ‘wild nature’ and landscape authenticity is radically attenuated, and the idea of pleasure in nature is extended.

Cruisers and ecologists have a shared interest in ‘unruly spaces’ since the loss of ‘wild urban nature’ reduces opportunities for public sex in nature and the enjoyment or study of nature itself. The possible formation of heterotopic alliances highlights the degree to which a queering of politics—or at least a queer sensibility—goes beyond a politics of recognition and “cannot be conceived as a politics of recognition *as opposed to* an issue of distributive justice” (Berlant and Warner, 1998, page 561, original emphasis). By extending a restricted notion of queer space towards a queering of social theory more generally, a wider set of conceptual interconnections across sexuality and space becomes apparent. At a political

⁽²⁵⁾ At the Abney Park woodland management meeting held on 12 October 2011, for example, local mycologist Gina Rackley noted that cruising activity assists species diversity by facilitating the spread of fungal spores to more overgrown parts of the site.

level, however, tensions exist between ‘acceptable’ gay culture and ‘public sexual culture’ despite the historical significance of the sexual appropriation of space as part of the nascent development of political activism in the past (Bell and Binnie, 2004; Warner, 2000).

The term ‘public sex’, however, is something of a misnomer since the politicization of sex in public space has rested to a significant degree on its periodic recognition or visibility within wider society. The decriminalization of homosexuality in the UK and elsewhere carried with it a sharpening of the legislative and political distinction between ‘private’ and ‘public’, which effectively excluded or ignored those sexual practices that no longer corresponded with the newly created “respectable ‘homosexual’ subject” (Houlbrook, 2005 page 243; see also Califa, 1994; Duggan, 2002).⁽²⁶⁾ The movement towards more restrictive forms of sociospatial differentiation worked against the actually existing complexity and ubiquity of sexuality within the modern city since for men with double or even multiple sexual identities the practice of cruising had long enabled a degree of anonymity and protection (see Gaissad, 2009). As Matt Houlbrook (2005) notes in the case of London during the first half of the 20th century, there was a vibrant culture of public sex, both homosexual and heterosexual, associated with parks, squares, and other spaces of urban nature, with its own distinctive microgeographies scattered across the city. As public cultures of heterosexuality declined from the 1950s onwards, however, distinctions between ‘respectable’ and ‘deviant’ forms of sexuality and sexual behaviour intensified. The place of sexuality within postwar discourses of modernization, reconstruction, and urban planning in London proved highly ambiguous (see Hornsey, 2010; Mort, 2010). The difference between the marginalized homosexual subject and the respectable homosexual subject became progressively accentuated, leaving poor, working-class, or married men in an increasingly precarious or anomalous position in relation to mainstream homosexual culture. In the case of Abney Park we find an echo of this earlier more heterogeneous public sexual culture, which has gradually receded from other parts of the city. If nothing else, queer theory must remain alive to the persistence not only of sexual difference but also of the complexity of the human subject. Cruising provokes anxiety or even violence precisely because it threatens the stability of the heterosexual male subject within the modern city.

The significance of Abney Park as an inclusive and heterogeneous public space has been heightened by growing divisions within London itself along lines of wealth, class, ethnicity, and other factors, so that the ‘island effect’ has become intensified over time. The park is essentially “a creation of neglect” that has evolved into a very different kind of space to that envisaged by its original creators.⁽²⁷⁾ There are tensions, however, between heritage-oriented understandings of the site exemplified by calls to recreate a version of the original 19th-century landscape and more recent emphasis on the cultural and ecological significance of its current form. Although not yet apparent in the case of Abney Park, the coalescence between heritage discourse and homophobia has played a significant role in urban design elsewhere and represents a clear counterposition to the types of heterotopic interests described here.

How significant might heterotopic alliances be in protecting both urban biodiversity and public cultures of sexual difference? In this paper we have explored possibilities for political constellations that might come into being as an alternative to the contemporary prevalence of utilitarian or historicist approaches to urban nature. At present, however, such instances are more coincidental than coordinated as in the shift of policing priorities that has taken place since the mid-1990s in some European parks that are acknowledged both as sites for cruising and also as significant elements in the ‘green infrastructure’ of the contemporary city. For example, in Ørstedsparken, Copenhagen, the role of the police has become oriented towards the protection

⁽²⁶⁾As Houlbrook (2005) shows, in the decade 1967–1977, after the decriminalization of homosexuality in the UK, the recorded incidence of indecency doubled.

⁽²⁷⁾Peter Jones, speaking at the joint meeting between the Abney Park Cemetery Trust and the Hackney Biodiversity Partnership, 6 April 2011.

of gay men from homophobic violence rather than entrapment, harassment, and other earlier practices. Park signs convey safe-sex messages as well as inventories of local wildlife.⁽²⁸⁾ And in the Netherlands, the police have advised Rotterdam, The Hague, and Utrecht to follow the example of Amsterdam in allowing cruising to take place legally within their parks. The role of the state has become more nuanced in relation to both public sex and urban ecological discourse in several European cities, producing coincidental patterns of shared interest rather than the self-conscious articulation of “unity across difference” (Oswin, 2008, page 96). The experience of London appears to lie somewhat ambiguously between the liberal approach of many northern European cities and the more intolerant stance of North America, East Asia, and elsewhere: the determining factor appears to be the types of political alliances formed in relation to specific spaces and the degree to which discourses of ‘property and propriety’ prevail.⁽²⁹⁾

Although originating within the field of sexuality the queering of spatial theory holds wider implications for understanding the ecological and material characteristics of urban space. The class and race dimensions of the iconography of urban landscapes, for example, take this discourse beyond mere issues of complexity, fluidity, or transgression to provide new points of engagement between a queering of spatial theory and the material production of urban space. The ‘queering’ of analytical approaches to urban space challenges categorizations and ‘mappings’ in their broadest sense so that we encounter a challenge to ‘neatness’ in relation to human subjectivities and material landscapes alike. We are left, however, with a conundrum: how far can queer theory be usefully or meaningfully extended beyond the realm of sexuality to the study of complexity, indeterminacy, and new models of scientific explanation more generally? It seems that in the case of ‘queer ecology’ this emerging field is most conceptually compelling in relation to the materiality of sexuality itself as an erotic terrain that lies beyond language, beyond the bounded human subject, and thus far largely beyond spatial theory itself.

Acknowledgements. I would like to thank Johan Andersson, Lucrezia Lennert, Richard Phillips, Peter Tatchell, and the referees for their insightful comments on an earlier version of this paper. Thanks also to members of the Hackney Environment Network for introducing me to the history and ecology of Abney Park.

References

- Andersson J, 2011a, “Heritage discourse and the desexualisation of public space: the ‘historical restorations’ of Bloomsbury’s squares” *Antipode* published online 14 November
- Andersson J, 2011b, “Queer nostalgia”, in *Urban Constellations* Ed. M Gandy (jovis, Berlin) pp 123–126
- Ariès P, 1974 *Western Attitudes Towards Death from the Middle Ages to the Present* translated by P N Ranum (Johns Hopkins University Press, Baltimore, MD)
- Arnold C, 2006 *Necropolis: London and its Dead* (Simon and Schuster, London)
- Åsdam K, 1995, “Heterotopia: art, pornography and cemeteries”, translated by D A Marmorstein, available at <http://www.knutasdam.net/Texts/HeterotopiaKAsdam.pdf>
- Bagemihl B, 1999 *Biological Exuberance: Animal Homosexuality and Natural Diversity* (St Martin’s Press, New York)
- Barad K, 2003, “Posthumanist performativity: toward an understanding of how matter comes to matter” *Signs* 28 801–831
- Barad K, 2008, “Queer causation and the ethics of mattering”, in *Queering the Non/Human* Eds N Giffney, M J Hird (Ashgate, Aldershot, Hants) pp 311–338

⁽²⁸⁾ In 2001 the artist Lasse Lau even recreated a dense space of vegetation inside a cabin in Ørstedsparken to enable “possibilities for self-realization in [the] public space” in protest at the earlier clearance of shrubs by municipal authorities (Lau in an interview with Trine Ross, <http://www.lasselau.dk>).

⁽²⁹⁾ The last fifteen years have seen changes in the policing of public spaces in London accompanied by changes in the law to update antiquated legislation in relation to public decency so that the emphasis is on the potential visibility of nonparticipants rather than on sexual behaviour itself (see, for example, Hennelly, 2010; Johnson, 2007; Travis, 2003).

- Barber S, 2002 *Projected Cities: Cinema and Urban Space* (Reaktion Books, London)
- Barkham P, 2010 *The Butterfly Isles: A Summer in Search of our Emperors and Admirals* (Granta, London)
- Bataille G, 1962 *Eroticism* translated by M Dalwood (Marion Boyars, London); first published in 1957
- Bech H, 1998, "Citysex: representing lust in public" *Theory, Culture and Society* **15** 215–241
- Bell D, Binnie J, 2004, "Authenticating queer space: citizenship, urbanism and governance" *Urban Studies* **41** 1807–1820
- Bennett J, 2010 *Vibrant Matter: A Political Ecology of Things* (Duke University Press, Durham, NC)
- Berlant L, Warner M, 1998, "Sex in public" *Critical Inquiry* **24** 547–566
- Berman M, 1982 *All That is Solid Melts into Air: The Experience of Modernity* (Verso, London)
- Berman M, 1999, "Views from the burning bridge", in *Urban Mythologies: The Bronx Represented Since the 1960s* (The Bronx Museum of the Arts, New York) pp 70–83
- Betsky A, 1995 *Building Sex: Men, Women, Architecture and the Construction of Sexuality* (William Morrow, New York)
- Betsky A, 1997 *Queer Space* (William Morrow, New York)
- Binnie J, 2001, "The erotic possibilities of the city", in *Pleasure Zones: Bodies, Cities, Spaces* Eds D Bell, J Binnie, R Holliday, R Longhurst, R Peace (Syracuse University Press, Syracuse, NY) pp 103–128
- Binnie J, 2004 *The Globalization of Sexuality* (Sage, London)
- Boag P, 2003 *Same-sex Affairs: Constructing and Controlling Homosexuality in the Pacific Northwest* (University of California Press, Berkeley, CA)
- Brah A, 1999, "The scent of memory: strangers, our own, and others" *Feminist Review* **61** 4–26
- Brown G, 2004, "Sites of public (homo)sex and the carnivalesque spaces of reclaim the streets", in *The Emancipatory City? Paradoxes and Possibilities* Ed. L Lees (Sage, London) pp 91–107
- Brown G, 2007, "Mutinous eruptions: autonomous spaces of radical queer activism" *Environment and Planning A* **39** 2685–2698
- Brown G, 2008, "Ceramics, clothing and other bodies: affective geographies of homoerotic cruising encounters" *Social and Cultural Geography* **9** 915–932
- Browne K, 2006, "Challenging queer geographies" *Antipode* **38** 885–893
- Butler J, 2004 *Undoing Gender* (Routledge, New York)
- Califia P, 1994 *Public Sex: The Culture of Radical Sex* (Cleis Press, Pittsburgh, PA)
- Castells M, 1983 *The City and the Grassroots: A Cross-cultural Theory of Urban Social Movements* (University of California Press, Berkeley, CA)
- Cauquelin A, 1977 *La ville de nuit* (Presses Universitaires de France, Paris)
- Chadwick G, 1966 *The Park and the Town* (Architectural Press, London)
- Chauncey G, 1994 *Gay New York: Gender, Urban Culture and the Making of the Gay Male World 1890–1940* (Basic Books, New York)
- Chisholm D, 2002, "A queer return to Walter Benjamin" *Journal of Urban History* **29** 25–38
- Chisholm D, 2005 *Queer Constellations: Subcultural Space in the Wake of the City* (University of Minnesota Press, Minneapolis, MN)
- Chisholm D, 2010, "Biophilia, creative involution, and the ecological future of queer desire", in *Queer Ecologies: Sex, Nature, Politics, Desire* Eds C Mortimer-Sandilands, B Erickson (University of Indiana Press, Bloomington, IN) pp 359–381
- Colebrook C, 2009, "On the very possibility of queer theory", in *Deleuze and Queer Theory* Eds C Nigianni, M Storr (Edinburgh University Press, Edinburgh) pp 11–23
- Conchie P, 1997, "Postcode from the edge: Abney's buried treasure" *The Independent* 10 October
- Coote S (Ed.), 1986 *The Penguin Book of Homosexual Verse* (Penguin Books, London); first published in 1983
- Cranz G, 1982 *The Politics of Park Design* (MIT Press, Cambridge, MA)
- Deering M, 2010, "From anti-social behaviour to X-rated: exploring social diversity and conflict in the cemetery", in *Deathscapes: Spaces for Death, Dying, Mourning and Remembrance* Eds A Maddrell, J D Sidaway (Ashgate, Farnham, Hants) pp 75–93
- de Lauretis T, 1991, "Queer theory: lesbian and gay sexualities" *differences: A Journal of Feminist Cultural Studies* **3** iii–xviii
- de Lauretis T, 1994, "Habit changes" *differences: A Journal of Feminist Cultural Studies* **6** 296–313
- Deleuze G, 1992 *Expressionism in Philosophy: Spinoza* translated by M Joughin (Zone Books, New York); first published in 1968

- de Solà-Morales Rubió I, 1993 "Terrain vague", in *Anyplace* Ed. C Davidson (MIT Press, Cambridge, MA) pp 118–123
- Doron G, 2001, "Transgressive architecture" *Loud Paper* 4(3) <http://www.loudpapermag.com/articles/transgressive-architecture>
- Doron G, 2002, "The bad sheets" *City* 6 43–59
- Duggan L, 2002, "The new normativity: the sexual politics of neoliberalism", in *Materializing Democracy: Toward a Revitalized Cultural Politics* Eds R Castronovo, D Nelson (Duke University Press, Durham, NC) pp 175–194
- Durand S, 2006 *Les territoires de l'homosexualité: impacts sur la ville* Mémoire de licence, Institut de Géographie, University of Lausanne
- Elden S, 2009, "Heterotopia", in *The Dictionary of Human Geography* Eds D Gregory, R Johnston, G Pratt, M J Watts, S Whatmore (Wiley-Blackwell, Oxford) page 330
- Empson W, 1935 *Some Versions of Pastoral* (Chatto and Windus, London)
- Estok S, 2009, "Theorizing in a space of ambivalent openness: ecocriticism and ecophobia" *Interdisciplinary Studies in Literature and Environment* 16 203–225
- Etlin R, 1983, "Between two worlds: cemetery design 1750–1850" *Lotus International* 38 83–89
- Foster H, 1996 *The Return of the Real: The Avant-garde at the End of the Century* (MIT Press, Cambridge, MA)
- Foucault M, 1984 [1967], "Des espaces autres" *Architecture, Mouvement, Continuité* 5 (October) 46–49
- Foucault M, 1998 [1984], "Different spaces", in *Aesthetics, Method and Epistemology: Essential Works of Foucault 1954–1984 volume 2* Ed. J B Faubion, translated by R Hurley (New Press, New York) pp 175–185
- Gaissad L, 2005, "From nightlife conventions to daytime hidden agendas: dynamics of urban sexual territories in the south of France" *Journal of Sex Research* 42(1) 20–27
- Gaissad L, 2008, "The moral territory: sexual frontiers and identities in urban/rural historiography", in *Frontiers and Identities: Cities in Regions and Nations* Eds L Klusáková, L Teulière (Plus-Pisa University Press, Pisa) pp 33–48
- Gaissad L, 2009, "Taming the bush: morality, AIDS prevention and gay sex in public spaces", in *Transgressive Sex: Subversion and Control in Erotic Encounters* Eds H Donnan, F Magowan (Berghahn, New York) pp 151–166
- Gissen D, 2009, "The architectural production of nature, Dendur/New York" *Grey Room* 34 58–79
- Grésillon B, 2000, "'Faces cachées de l'urbain' ou éléments d'une nouvelle centralité?: les lieux de la culture homosexuelle à Berlin" *L'Espace Géographique* 4 301–313
- Halberstam J, 2005 *In a Queer Time and Place: Transgender Bodies, Subcultural Lives* (State University of New York Press, New York)
- Harvey D, 2000, "Cosmopolitanism and the banality of geographical evils" *Public Culture* 12 529–564
- Hennelly S, 2010, "Public space, public morality: the media construction of sex in public spaces" *Liverpool Law Review* 31 69–91
- Hetherington K, 1997 *The Badlands of Modernity: Heterotopia and Social Ordering* (Routledge, London)
- Heynen N, Kaika M, Swyngedouw E (Eds), 2006 *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism* (Routledge, London)
- Hinchliffe S, Kearns B, Degen M, Whatmore S, 2005, "Urban wild things: a cosmopolitical experiment" *Environment and Planning D: Society and Space* 23 643–658
- Hitchmough J, Dunnett N, 2004, "Introduction to naturalistic planting in urban landscapes", in *The Dynamic Landscape* Eds N Dunnett, J Hitchmough (Spon, London) pp 1–22
- Hollister J, 1999, "A highway rest area as socially reproducible site", in *Public Sex/Gay Space* Ed. W L Leap (Columbia University Press, New York) pp 55–70
- Hornsey R, 2010 *The Spiv and the Architect: Unruly Life in Postwar London* (University of Minnesota Press, Minneapolis, MN)
- Houlbrook M, 2005 *Queer London: Perils and Pleasures in the Sexual Metropolis, 1918–1957* (University of Chicago Press, Chicago, IL)
- Howell P, 2009 *Geographies of Regulation: Policing Prostitution in Nineteenth-century Britain and the Empire* (Cambridge University Press, Cambridge)

- Hubbard P, 2000, "Desire/disgust: mapping the moral contours of heterosexuality" *Progress in Human Geography* **24** 191–217
- Hubbard P, 2001, "Sex zones: intimacy, citizenship and public space" *Sexualities* **4** 51–71
- Humphreys L, 1999 [1975], "Tea room trade: impersonal sex in public spaces", in *Public Sex/Gay Space* Ed. W L Leap (Columbia University Press, New York) pp 29–54
- Ingram G B, 1997, "'Open' space as strategic queer sites", in *Queers in Space: Communities/Public Spaces/Sites of Resistance* Eds G B Ingram, A-M Bouthillette, Y Retter (Bay Press, Seattle, WA) pp 95–125
- Ingram G B, 2010, "Fragments, edges, and matrices: retheorizing the formation of a so-called gay ghetto through queering landscape ecology", in *Queer Ecologies: Sex, Nature, Politics, Desire* Eds C Mortimer-Sandilands, B Erickson (Indiana University Press, Bloomington, IN) pp 254–282
- Jagose A, 1996 *Queer Theory: An Introduction* (University of Melbourne Press, Melbourne)
- Johnson P, 2007, "Ordinary folk and cottaging: law, morality and public sex" *Journal of Law and Society* **34** 520–543
- Joyce P, 1994 *A Guide to Abney Park Cemetery* Abney Park Cemetery Trust, London
- Kowarik I, Körner S (Eds), 2005 *Wild Urban Woodlands: New Perspectives on Urban Forestry* (Springer, New York)
- Lachmund J, 2003, "Exploring the city of rubble: botanical fieldwork in bombed cities in Germany after World War II" *Osiris* **18** 234–254
- Lawrence H W, 1993, "The greening of the squares of London: transformation of urban landscape and ideals" *Annals of the Association of American Geographers* **83** 90–118
- Lefebvre H, 1970 *Du rural à l'urbain* (Anthropos, Paris)
- Lefebvre H, 2003 *The Urban Revolution* translated by R Bononno (University of Minnesota Press, Minneapolis, MN); first published in 1970
- Lévesque L, 2009, "Towards an interstitial approach to urban landscape" *Territorio* **48** 77–82
- Longcore T, Rich C, 2004, "Ecological light pollution" *Frontiers in Ecology and the Environment* **2** 191–198
- Mabey R, 2010 *Weeds* (Profile, London)
- McHarg I L, 1992 *Design with Nature* (John Wiley, New York); first published in 1969
- Machery P, 1996, "The encounter with Spinoza", in *The Deleuze Reader* Ed. P Patton (Blackwell, Oxford) pp 139–161
- Meller H, Parsons B, 2008 *London Cemeteries: An Illustrated Guide and Gazetteer* (History Press, Stroud, Glos)
- Miéville C, 2009 *The City and the City* (Pan Macmillan, London)
- Mort F, 2010 *Capital Affairs: London and the Making of the Permissive Society* (Yale University Press, New Haven, CT)
- Mortimer-Sandilands C, 2005, "Unnatural passions: notes towards a queer ecology" *Invisible Culture: an Electronic Journal for Visual Culture* **9**; available at: http://www.rochester.edu/in_visible_culture/issue_9/sandilands.html
- Mortimer-Sandilands C, 2010, "Melancholy natures, queer ecologies", in *Queer Ecologies: Sex, Nature, Politics, Desire* Eds C Mortimer-Sandilands, B Erickson (University of Indiana Press, Bloomington, IN) pp 331–358
- Muñoz J E, 2009 *Cruising Utopia: The Then and There of Queer Futurity* (New York University Press, New York)
- Oswin N, 2008, "Critical geographies and use of sexuality: deconstructing queer space" *Progress in Human Geography* **32** 89–103
- Patrick D, 2010, "Un-natural developments: spaces of urban-nature and the potential for emancipatory politics", mimeo available from author
- Perkins H A, 2007, "Ecologies of actor-networks and (non)social labor within the urban political economies of nature" *Geoforum* **38** 1152–1162
- Philips K M, Reay B, 2002, "Introduction", in *Sexualities in History: A Reader* Eds K M Philips, B Reay (Routledge, London) pp 1–23
- Raban J, 1974 *Soft City* (Hamish Hamilton, London)
- Reisen C A, Zea M C, Bianchi F T, Poppen P J, 2011, "Characteristics of latino MSM who have sex in public settings" *AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV* **23** 456–459

- Rose-Redwood R (Ed.), 2010, "Encountering Mannahatta: a critical review forum" *Cartographica: An International Journal for Geographic Information and Geovisualization* **45** 241–272
- Rouse S, 2004, "Barad's feminist naturalism" *Hypatia* **19** 142–161
- Sanderson E, 2009 *Mannahatta/Manhattan: A Natural History of New York* (Harry N Abrams, New York)
- Sandhu S, 2006 *Night Haunts: A Journey Through the London Night* (Verso, London)
- Schlör J, 1998 *Nights in the Big City: Paris, Berlin, London 1840–1940* translated by P G Imhoff, D R Roberts (Reaktion Books, London)
- Schnepel B, Ben-Ari, E, 2005, "Introduction: 'When darkness comes...': steps toward an anthropology of the night" *Paideuma* **51** 155–163
- Shane D G, 2011 *Urban Design Since 1945: A Global Perspective* (John Wiley, Chichester, Sussex)
- Shuttleton D, 2000, "The queer politics of gay pastoral", in *De-centring Sexualities: Politics and Representation Beyond the Metropolis* Eds R Phillips, D West, D Shuttleton (Routledge, London) pp 125–146
- Sinclair I, 1997 *Lights out for the Territory* (Granta, London)
- Sinclair I, 2009 *Hackney, That Rose-red Empire: A Confidential Report* (Hamish Hamilton, London)
- Stallabrass J, 1999 *High Art Lite* (Verso, London)
- Steyaert C, 2010, "Queering space: heterotopic life in Derek Jarman's garden" *Gender, Work and Organization* **17** 46–68
- Strange V, Bonell C, Barnett-Page E, 2004 *In the City: An Evaluation of Detached Work in Commercial Venues and Public Sex Environments* (Social Science Research Unit and Institute of Education, London)
- Sukopp H, 2002, "On the early history of urban ecology in Europe" *Preslia* **74** 373–393
- Sullivan N, 2003 *A Critical Introduction to Queer Theory* (State University of New York Press, Albany, NY)
- Tafuri M, 1976 *Architecture and Utopia: Design and Capitalist Development* translated by B Luigia La Penta (MIT Press, Cambridge, MA); first published in 1973
- Travis A, 2003, "Your last chance to have sex in the garden" *The Guardian* 30 January
- Turner M W, 2003, "Gay London", in *London: From Punk to Blair* Eds J Kerr, A Gibson (Reaktion Books, London) pp 48–59
- Walford E, 1877 *Old and New London: A Narrative of its History, its People, and its Places* (Cassell, Petter and Galpin, London)
- Warner M, 2000, "Zones of privacy", in *What's Left of Theory? New Work on the Politics of Literary Theory* Eds J Butler, J Guillory, K Thomas (Routledge, London) pp 75–113
- Weitz E D, 2007 *Weimar Germany: Promise and Tragedy* (Princeton University Press, Princeton, NJ)
- Wolch J, 2002, "Anima urbis" *Progress in Human Geography* **26** 721–742
- Wright P, 1991 *A Journey Through Ruins: The Last Days of London* (Radius Books, London)
- Zisenis M, 1996, "Secondary woodland on Nunhead Cemetery, London, UK" *Landschaftsentwicklung und Umweltforschung* **104** 73–79
- Zitouni B, 2010 *Agglomérer: Une anatomie de l'extension bruxelloise (1828–1915)* (University of Brussels Press, Brussels)

Filmography

- Jarman D (Dir.), 1987 *Last of England* (Anglo International Films, British Screen Productions, Channel Four Films, Tartan Films, Zweites Deutsches Fernsehen)

This article is an advance online publication. It will not change in content under normal circumstances but will be given full volume, issue, and page numbers in the final PDF version, which will be made available shortly before production of the printed version.

Conditions of use. This article may be downloaded from the E&P website for personal research by members of subscribing organisations. This PDF may not be placed on any website (or other online distribution system) without permission of the publisher.