

# Online Research @ Cardiff

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository: <https://orca.cardiff.ac.uk/76782/>

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Fitzgerald, Des, Rose, Nikolas and Singh, Iina 2016. Revitalising sociology: urban life and mental illness between history and the present. *British Journal of Sociology* 67 (1) , pp. 138-160. 10.1111/1468-4446.12188 file

Publishers page: <http://dx.doi.org/10.1111/1468-4446.12188>  
<<http://dx.doi.org/10.1111/1468-4446.12188>>

Please note:

Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies.

See

<http://orca.cf.ac.uk/policies.html> for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.



**Revitalising Sociology:**  
**Urban Life and Mental Illness between History and the Present**

**Des Fitzgerald\***  
Cardiff University

**Nikolas Rose**  
King's College London

**Ilina Singh**  
Oxford University

This is a pre-print (the version before peer review) of an article accepted for publication in the *British Journal of Sociology*. An updated record will follow on final publication of the manuscript. Copyright over this material is held and asserted by the authors (Des Fitzgerald, Nikolas Rose, and Ilina Singh).

Research for this paper was funded by a grant from the Economic and Social Science Research Council grant, 'A New Sociology for a New Century: Transforming the Relations between Sociology and Neuroscience, through a Study of Mental Life and The City' (ES/L003074/1).

\*Corresponding author: [FitzgeraldP@cardiff.ac.uk](mailto:FitzgeraldP@cardiff.ac.uk)

## Abstract

This paper proposes a re-thinking of the relationship between sociology and the biological sciences. Tracing lines of connection between the history of sociology and the contemporary landscape of biology, the paper argues for a refiguration of this relationship *beyond* popular rhetorics of 'biologization' or 'medicalization.' At the heart of the paper is a claim that, today, there are some potent new frames for re-imagining the traffic between sociological and biological research – even for 'revitalizing' the sociological enterprise as such. The paper threads this argument through one empirical case: the relationship between urban life and mental illness. In its first section, it shows how this relationship enlivened both early psychiatric epidemiology, *and* some forms of the new discipline of sociology; it then traces the historical division of these sciences, as the sociological investment in psychiatric questions waned, and 'the social' become marginalized within an increasingly 'biological' psychiatry. In its third section, however, the paper shows how this relationship has lately been revived, but now by a nuanced epigenetic and neurobiological attention to the links between mental health and urban life. What role can sociology play here? In its final section, the paper shows how this *older* sociology, with its lively interest in the psychiatric and neurobiological vicissitudes of urban social life, can be our guide in helping to identify intersections between sociological and biological attention. With a new century now underway, the paper concludes by suggesting that the relationship between urban life and mental illness may prove a core testing-ground for a 're-vitalized' sociology.

## Introduction

In a recent editorial on 'Life Stresses,' the editors of *Nature* asked sociologists and biologists to finally 'bury the hatchet' (*Nature*, 2012: 143). Reading the intellectual history of the twentieth century as a split between those 'who believed that we are determined only by our genes' and those who had 'built a nurture fortress' in response – the editors argued that something has now changed: due to a range of factors, but particularly because of recent findings about the epigenetic effects of stressful environments, the biological sciences have 'abandoned any concept of biological determinism' (*ibid.*). We now know 'beyond doubt that although our genes are fixed, their expression is highly dependent on what our environment throws at us' (*ibid.*). And yet, 'only a handful of sociologists [seem] to notice that a new area of potential collaboration is opening up without their input' (*ibid.*) If biologists need to 'learn the language of sociology,' then sociologists, if they would only recognise this potential, would also 'stand to benefit from the understanding that biology will bring to their own, vindicated, empirical research' (*ibid.*).

This is a somewhat tendentious account of the wavering history of 'nature and nurture,' and of sociology's place *within* that history. Still, we agree with the editorial's basic sentiment: it is a caricature – and one we complicate below – but it is not inaccurate to say that sociology's relationship to the life sciences, at least since the mid-twentieth century, has largely been one of suspicion, and even of denunciation (Lemke, 2004; Jackson and Rees, 2007; see Author 2, 2013). Such critique was understandable given the bloody history of biological politics in the first half of the twentieth century (and earlier). But we believe that there is now scope to imagine a new relationship between sociology and biology. The relationship we have in mind is risky and collaborative, and yet also mundane and empirical endeavour; it focuses on some central questions which have concerned both of these disciplines, but it pays particular attention to entanglements of illness, suffering, health and social life.

In what follows, we take up the challenge from the editors of *Nature*. We do this in two ways. First, we consider what the sociological contribution might be here, and we seek out a more rigorous sense of what that 'vindicated' sociological research is, to which the editorial refers. Second, as most sociologists would agree with *Nature* that this is an *historical* question, we sketch a more complex genealogy of sociology's relations with biology. We will show, in particular, that we have been here before – at least as far as the relations between sociologists and biological psychiatrists are concerned. From the late nineteenth century – before the psychiatric sciences became so intensely focused on individual biology, and the social sciences made a metaphysical fetish of 'the social' – a research programme existed that was simultaneously psychiatric *and* sociological, and in which intimate entanglements of experience, social life, and biology, were very much at stake. We too

have argued for the kind of *rapprochement* that the Nature editorial desires; in this paper, through an exploration of the history of those entanglements between sociology and psychiatry, we aim to clarify the character of this research programme, to understand its fate, and to think about what its insights might teach us today.

We focus on one case-study that exemplifies the complexity of the mutual transactions between the biological and social sciences. This concerns the association between the probability of being diagnosed with a serious mental health problem, and particular forms (and experiences) of urban life (Hollingshead and Redlich, 1956; Galea *et al.*, 2011). This association has been recognized since at least the 19<sup>th</sup> century (Malzberg, 1930), and the question of mental life and the metropolis was a foundational concern for some influential schools of sociological theory and research (Simmel, 1919; Faris and Dunham, 1939). From the mid-1960s, however, sociological interest in this issue declined, as part of a wider turn *away* from psychiatry and from the study of environmental influences on human pathologies (Schatzman and Strauss, 1967; Smith 1995). However it has recently been re-vivified, not by sociologists, but by a 'post-genomic' biological programme which is once again addressing the biological traces left by urban social life (Galea *et al.*, 2011). And yet, despite the previous tradition of sociological work on these issues, these novel biological investigations have seldom been welcomed by sociologists, let alone recognized as reviving a longstanding sociological concern. Indeed, to the extent that they have been noticed at all, scholars from the social sciences have questioned the implications of a 'molecularisation of milieu,' (Niewöhner, 2011: 292), worrying about 'implicit assumptions about the nature of social life...which may warrant questioning' (Pickersgill *et al.*, 2013: 440-441), and seeking to contest 'the appalling appeal of nature' (Jackson and Rees, 2007).

Undoubtedly these new developments in the life sciences need to be approached with caution. However we argue that repeated, and easy, critiques of molecularization, biologization, or medicalization have become stale. Instead, we invite readers to imagine a sociology that has a more generous, trusting and collaborative approach to the new openness to 'sociality' in the life sciences. To the extent that it helps clarify the dynamics of entanglement that have characterised 'biosocial' forms of knowledge, we can learn something useful from the history of studies of urban life and mental health. This history shows how questions that may now seem surprising, or unsettling, were also asked in other times and other places: it can help inspire the kind of cosmopolitan attitude that we need if we are to reactivate these relations today.

Of course, there have been many other calls for a biologically-oriented sociology (Benton, 1991; Freese and Shostak, 2009). Sociologists have pursued related themes in a number of areas, not least in the rich literatures on embodied (Shilling, 2007) and affective (Blackman, 2012)

relationalities. The complex entanglements of psychiatry, biology, culture and place have been explored in other areas of the social sciences, not least in medical anthropology (Kleinman, 2008), and in health geography (Wolch and Philo, 2000). But we address our argument squarely to the theoretical and empirical heartland of sociology. In this heartland, neither the social developments in the biological sciences, nor the calls for biological-sociological *rapprochement*, have attracted much attention: for example the word ‘epigenetics,’ has still not appeared in the pages of the *British Journal of Sociology*.

In this paper, we address that gap. First, we set out the historical relationship between ‘madness and the metropolis,’ as it was established in psychiatric epidemiology, and then in the new discipline of sociology; we will focus, here, mostly on the American case, where the diverse histories of social psychiatry, including its links to urban sociology, have been more comprehensively studied (Srole, 1977; Grob, 1985). In the second and third sections, we trace the fall-off in the sociological interest in this topic within a general rise of the hermeneutics of suspicion in the discipline, but we also show how this research has since been re-vivified through neurobiological, epigenetic and other attentions to the traffic between mental health categories and the politics of urban life. In the final section, we elaborate four points of intersection between the sociological and life sciences. We conclude with a call for a ‘re-vitalized’ sociology, one in which culture, society, history, biology, sickness, suffering, and marginalization, are brought into a concrete and dynamic relationship – in which sociologists can learn, again, to track and understand the mutually constitutive relationships between biology, embodiment, social life, health and sickness.

## **Madness and the Metropolis**

The association between city living and poor mental health is among the oldest and most consistent findings in psychiatric epidemiology. Much of that research, embedded in dynamics of rapid industrialization, urbanization, and immigration, was pioneered in the United States: in 1903, in a study of all patients admitted to the Connecticut Hospital for the Insane between 1868 and 1901, RH Burr showed that rates of mental illness among inhabitants of cities were consistently 20-30% higher than those for towns or rural areas: ‘the urban life,’ argued Burr, ‘is more productive of insanity than the suburban or country life’ (1903: 311). Ten years later, another American survey on the ‘insane and feeble-minded,’ showed that ‘from rural communities... the ratio of admissions was 41.4 per 100,000 population; from cities...the ratio was more than twice as high, being 86 per 100,000’ (United States Bureau of the Census, 1914: 50). We must conclude, says the report that ‘there is relatively more insanity in cities than in county districts and in large cities than in small cities’ (ibid.). About ten years later again, in 1925, Horatio M. Pollock, in the *American Journal of*

*Psychiatry*, drawing on updated census data, showed again, that admissions to mental hospitals were overwhelmingly dominated by people who lived in cities. ‘We can but regret,’ Pollock concluded, ‘the many unearned tears we have shed for the ‘poor, lonesome, languishing, isolated, farmer’s wife’ (1925: 222).

Such works of early psychiatric epidemiology, which alighted on the persistence of unusually high rates of admissions to ‘insane asylums’ within urban areas, pointed to some potentially causal factors in the likelihood of insanity that lay *beyond* the individual – specifically, in some quality of city life at the turn of the century. This concern emerged within a specific political and intellectual landscape that we can only sketch here. First, the focus on the relationship between mental illness and the metropolis was connected to a specifically Protestant, bourgeois belief in the virtues of an agrarian existence *as opposed to* the temptations of the city (Grob, 1985: 230). Further, as Horwitz and Grob remind us, the interpretation of disease in nineteenth-century psychiatry may have been more-or-less somatic, but treatment remained both a moral and an *environmental* project: the goal of the psychiatrist was to ‘create a new environment that broke with those prior harmful environmental influences that led to insanity’ (2011: 631). This attention to insanity in the city was thus not a concern with *epidemiology* but arose from a religious, ethical and *social* commitment to understanding the disturbing and deleterious relationship between modern society and mental health (ibid.: 632).

Of course, these early concerns about mental life in the US city were inextricably linked to another set of more general concerns – not immigration from the countryside to the city, but immigration *per se*. In the heterogeneous eugenic arguments that characterised debates in the US at the turn of the century, one specific focus was on the waves of immigration from Europe. Francis Walker, the Director of the US Census, the ‘intellectual founder of the immigration restriction movement...warned native Americans that they were being overrun by hordes of ‘degraded’ immigrants from Southern and Eastern Europe: ‘beaten men from beaten races’” (Walker 1899, cited in Conk 1987: 162; *cf.* Author 2, 1999). Walker differentiated these new immigrants from those that had constituted the America of the nineteenth century, and gathered evidence about their impact on the population in the form of maps of population-density showing the prevalence of those new immigrants in particular areas. These arguments played a key role in the passage of The National Origins Act of 1924, which called for a calculation of ‘the number of inhabitants in the continental United States in 1920 whose origin by birth or ancestry is attributable to [each] geographical area’ – legislation which, in fact, was warmly regarded by German racial hygienists (ibid.). Concern came to focus, in particular, on the fact that those ‘beaten men from beaten races’ – the Irish, the Southern Europeans, the Jews – were concentrated in the cities, manifesting their pathological heredity in

alcoholism, superstition, promiscuity and indeed in all the forms of mental deterioration linked to insanity. While the leading explanation for the rates of insanity in cities was that they were magnets for such degenerates, others argued that the conditions of urban life were actually the causal factor, while others argued that, in fact, it was merely that the insane were more readily identified in the cities. See Malzberg, 1930, for an early analysis). There is, of course, much more to be said about these early debates and their eugenic character. But what especially interests us here is the kind of investigation that began to take shape within this field of arguments about urban insanity - and especially the alliances that came together around it. Here, we focus on just one element among many: an element that was to become critical in the emergence of distinctively sociological thought-styles: human ecology (Park, 1936).

As Matthias Gross (2004) shows his history of 'human ecology' in sociology and geography, the concept of 'ecology,' then predominantly a botanical concept, into sociology through the first students at the University of Chicago's sociology department. Albion J. Small, the founder both of that department, and of the *American Journal of Sociology*, had already imagined the new discipline through botanical and zoological models – as a form of inquiry deeply sensitive to the biological constraints of nature and the environment (Gross, 2004: 578). But it was Small's student, Edward C. Hayes, through his association with the also-nascent geography department at Chicago, who gave this grounding a specifically ecological turn. In his turn to human ecology as the empirical ground for sociological thought, Hayes (1911) set himself very deliberately against 'metaphysical tendencies' within the new discipline; thus very much against the Durkheimian instance on an extra-somatic, extra-environmental domain of 'the social,' Hayes outlined a 'flexible model of human society and the environment, which propagated [sic.] neither to reduce society to nature, nor nature to society, but instead to explore their interactions (Gross, 2004: 586). As *urban* sociology, in turn, developed in Chicago, scholars such as Robert Park, in search of the city's 'metabolism,' turned to a specifically 'ecological theory of concentric zones, applied to the city of Chicago' (Bulmer, 1984: 6). The task for such an urban ecology could *only be* the measurement and mapping of social phenomena within bonded ecological territories: 'the city,' Park and Burgess would famously write in 1925, is not 'merely a physical mechanism and an artificial construction. It is involved in the vital processes of the people who compose it; It is a product of nature' (Park and Burgess, 1925: 1).

Park and Burgess's text was widely influential. It was also cited on the first page of the monograph that would perhaps go furthest in simultaneously expanding the socio-biological ambiguity of psychiatric epidemiology *and* the ecological turn in American sociology: Faris and Dunham's *Mental Disorders in Urban Areas* (1939). Faris and Dunham sought to understand the longstanding psychiatric and epidemiological association between the city and mental health, in



sociological and urban-ecological terms. Their study drew on the ambiguous relations between biological and sociological research and *used* that ambiguity to carve out an important and novel space between sociology and psychiatry – a space that was, at once, sociological, biological, historical, and geographical. As Ernest Burgess noted in his introduction, the study was not simply a more local and detailed regurgitation of the association between urbanicity and mental illness: it was in ambitious pursuit of ‘the relationship between community life and mental life’ (xviii). Locating themselves firmly within a topographic commitment to the natural territory of the city, and starting from the observation that ‘normal mentality can only develop through the participation of a healthy physiological mechanism in an adequate social organisation,’ Faris and Dunham made two core claims (vi). First, (this is Burgess’s useful gloss) they argued that mental illness associates with specific social problems: ‘cases of mental disorders, as plotted by residence of patients previous to admission,’ decrease from the centre to the periphery of the city, in more or less the same distributive pattern as ‘poverty, unemployment, juvenile delinquency, adult crime, suicide, family desertion’ (ix-x) Second, on that basis, they argued that psychiatric diagnoses have predictable urban social geographies:

paranoid schizophrenia [is correlated] with percentage of hotel residents and lodgers; catatonic schizophrenia with percentage of foreign-born and Negroes; manic-depressive psychosis with median monthly rentals; alcoholic psychoses with per cent of population on relief; dementia paralytica with distribution of vice resorts...senile psychoses with percentage of home ownership; senile psychoses combined with arteriosclerosis with percentage of population on relief and with per cent of population of native white parentage (x)

Faris and Dunham, seeking to interpret these findings, argued that ‘the human mind is built on, and is never independent of, a physiological base... [However] the mind...is [also] a product of a process of social interaction. Mentality, abilities, behaviour, are all achievements of the person, developed in a history of long interaction with his surroundings, both physical and social’ (152). What is particularly striking to us, in any event, three quarters of a century later, is how deeply naturalistic, and biological, is Faris and Dunham’s feel for those physical surroundings, and the care with which they trace ‘influences from the community at large to persons, and from persons to intimate friends’ as well as ‘paths of physiological communication, including sense organs, nerve paths connecting with centers, all supported by sufficiently normal functioning of many parts of the body, including glands, muscles, etc’ (154-155).

We do not lionize this contribution. The contemporary reader cannot ignore how generally grim Faris and Dunham’s view of the city is; nor how they look upon ‘slums’ populated by ‘foreign-born individuals’ forming a ‘chaotic background,’ nor their pathologisation of ‘interracial and intercultural marriages’ (159); nor is easy to overlook a general joy in bourgeois, suburban,

heterosexual life – free of the noise and disorganisation of the multicultural city (*cf.* Srole, 1977: 469). Faris and Dunham are products of their time in both happy and unhappy ways. And yet, while recognising these problems, we draw attention to the remarkable way in which these authors simply – even naïvely – refused to take organic psychiatry and social life as separate domains of inquiry. In a way that is distinct both from the epidemiological work that preceded them, and from much of both the psychiatric and sociological interest in mental health that came after them, they insisted that the human organism, in its mental distress, could only be understood as a product and an inhabitant of a social world; that the urban environment, in all its poverty, and inequality, and racial exclusion, and squalid housing, could only be interpreted as both a bearer and producer of biological and physiological marks. Whatever its other problems, the sheer *vitality* of this enterprise provokes us.

## **Disassembling the social**

Faris and Dunham's 'ecological study' received some positive attention from the mental health establishment: 'the psychiatrist who is eager for the advancement of psychiatry will make this book a part of his library,' noted a reviewer in the *American Journal of Psychiatry* 'and will welcome these sociologists and the discipline they represent as his allies' (Myerson, 1940: 997). In the *Journal of Abnormal and Social Psychology*, another reviewer, stressing the truism that 'social relations and experiences contribute to the development of normal personality,' commended this 'pioneering' and 'serious attempt to take the patient out of the clinic and study him in the full light of day in his natural habitat' (Mueller, 1940: 593). Some enthusiastic follow-up studies across the psychiatric-sociological literature appeared – notably, the work of Hare (1955) in Bristol, and Schroeder (1942) in five other American cities. Yet the expansive and wide-ranging programme that this research portended, and that reviewers of their monograph looked forward to – ecological, naturalistic, sociological, psychiatric – had already peaked. By the mid-1960s, this delicate tacking back-and-forth between the natural histories of cities and psyches appeared less pioneering than it did deeply naïve. The reasons are, of course, complex, but we can isolate some of the more important factors here.

First, not least because of methodological concerns about how well its measures actually correlated with individual behaviour (Robinson, 1950), the ecological approach fell out of fashion in sociology – and, also, although more slowly, in urban studies. Under the influence of critical theory and neo-Marxist sociology, scholars within the 'new urban sociology' began to turn away from 'the functionalist image of society's tendency towards adaptation' (Smith, 1995; see e.g. Castells, 1977). The developing 'critical' sociology not only made the naturalistic work of scholars like Faris and Dunham seem hopelessly old-fashioned, but it disrupted the relationship between sociology and psychiatry. If these had once been co-evolving sciences, with a free-flowing traffic of concepts,

methods, and research topics, a mutually suspicious relationship developed in the 1960s. Indeed, arguing for a new 'sociology of psychiatry,' in *Social Forces*, in 1967, Schatzman and Strauss declared their 'concern for some questionable benefits accruing to sociology from its association with, and application to, professional practice and service fields like psychiatry. Social scientists generally may well feel flattered by the demand for their skills and products. Yet...it would be much more fruitful for sociology if more research were done about psychiatry than in it or for it.' (1966: 3-4). There were, and are, very good reasons for sociological criticisms of many psychiatric theories of that period, especially those that individualised and de-socialised mental disorder – and of the conditions in the psychiatric apparatus over which they presided. Yet, despite the persistence of certain kinds of social psychiatry, as we shall see, the breach between sociology and psychiatry that developed from the mid-1960s (Pilgrim and Rogers, 2005), also marked the end, or at the least the retreat, of that earlier project in which an understanding of the forms of suffering named as mental illness demanded intense attention to the relations between the living, vital human being and his or her social, environmental milieu.

But there is another important, and perhaps less obvious, reason that the programme promised by Faris and Dunham's research never fully emerged. As the emerging disciplines of psychiatry, sociology and epidemiology grew and professionalized through the mid-twentieth century, the wide, generous, fuzzy 'social' of Faris and Dunham's 'sociology,' was translated into the much more thinly-defined 'social' that one finds in social and community psychiatry. This is concerned with, for example, 'the distribution and determinants of undesirable social and health conditions' (Bloom, 1964: 424), translated into a series of quantifiable and measurable 'demographic characteristics' (Bahn et al., 1961); elsewhere characteristics of the city were quantified into tabulated ecological 'correlation matrices,' between specific urban characteristic and particular psychiatric diagnoses (Rowitz and Levy, 1968). This more formalized and quantified social psychiatry later revisited Faris and Dunham's data with unflattering results (Mintz and Schwartz, 1964) – while even Dunham himself was moved, in the face of this and other critiques, to retrospectively re-situate his and Faris's earlier work within 'the larger, general area that has been gradually emerging as social psychiatry' (1966). When it focused on the relationship between mental health and the city as such, this literature also became consumed with narrowly parsing social 'causation' from social 'drift' (in other words: did urban life, and/or low socioeconomic status 'cause' mental illness, or did the mentally ill inevitably 'drift' towards these locales, and this reduced status, as a result of their conditions?). The former was usually peremptorily dismissed: in a 1980 review of social psychiatry in the United Kingdom, for example, John Wing, then professor of social psychiatry at the Institute of Psychiatry in London, firmly rejected the role of social life in the aetiology of schizophrenia, arguing

that

British workers have put several hypotheses concerning the causation of schizophrenia to searching test. This is particularly true of theories suggesting that the condition was generated by living in conditions of poverty and isolation... [which are in fact] actively sought by the individual instead of being a cause of the breakdown' (Wing, 1980: 558)

Around the same period, writing in the *Community Mental Health Journal*, two American sociologists proclaimed the good news that sociologists might now become consultants to psychiatric practice: 'the consultative function of the sociologist,' they explained, 'will be to interpret and evaluate computer outputs and their utilization by state mental health offices.' Something has clearly gone awry in the imagination of what a 'social' science might contribute to how we think about psychiatric distress.

We have necessarily compressed a complex series of developments. Yet it is clear that the possibilities identified by those like Faris and Dunham – that psychiatric illness, through its constitutive association with urban life, and with poverty, and marginalisation, and racism etc., might become the meeting-ground for a more profound relation between the sociological and life sciences – never really came to pass. Instead, Schatzman and Strauss's critical sociology of psychiatry became the dominant mode: sociologists turned to critique of a 'medical model,' in which psychiatric professionals acted as 'social control agents,' and patients were placed 'under the control of physicians who may employ incarceration, drugs, electro-shock, and other 'treatments,'" (Goldstein, 1979). Let us stress again that we are not suggesting that the critical attention to psychiatric theory and practice in this period was misplaced, although some of it undoubtedly was over general and over-dismissive of the distress that many psychiatrists sought to alleviate. Our aim is to point to the fact that it proved very hard to maintain the broader connections between the sociological and psychiatric sciences, in the heat of this debate. If the questions of mental life in the metropolis had once exemplified the possibility of a transdisciplinary project between the social and life sciences, perhaps serving as a more general exemplar, by the 1980s the relation between sociology and psychiatry exemplified precisely the opposite: it revealed how forcefully the social and the biological had been prised apart.

## **History and the present**

Today, things are rather different. In the opening decades of the twenty-first century, there was a rapid resurgence of interest – not only in the association of urbanicity and mental illness, but in the mutually constitutive ways in which the environment of the city, and the biology of the body, come to shape and re-shape one another. Strikingly, this resurgent interest has not come from sociology

but from within the biosciences themselves, from epidemiology (itself poised on the cusp of the natural and social sciences) and from some new modes of understanding the biological development of human life, and its relationship to the environment in which that life finds itself. As the epidemiologist Sandro Galea and his colleagues pointed out in 2011, 'there is an emerging interest in identifying biologic explanations that may clarify the link between features of the urban environment and individual mental health' (2011: 401). Having been 'eclipsed for a period of time,' March *et al.* point out in a review, 'interest in the etiologic role of social context has been revived' (2008: 84). But what has been little noticed so far is how this literature, at the leading edge of the contemporary biosciences, recapitulates fundamental intuitions, themes and assumptions of the biologically-influenced sociology of the 1930s. Yet this is a form of sociological reasoning now profoundly unfashionable among leading practitioners in urban sociology (Gieryn, 2000; Dear 2002; see Sassen, 2000, for a nuanced account of these inheritances). Let us sketch some of the key elements in this emerging research-programme.

For many researchers in this area, *stress* has been the gateway for bringing 'context' back in. Building on the work of Michael Meaney (2001) – whose pioneering epigenetic research showed that gene expression could be mediated by environmental factors – Galea and his group studied residents of a Detroit neighbourhood, showing how distinctive methylation profiles in particular gene clusters could be seen in residents who had been assaulted, and who met criteria for lifetime PTSD and depression. Showing a linear relationship between the presence of such profiles and the number of assaultive events experienced by an individual, they suggest that 'that cumulative traumatic burden may leave a molecular footprint in those with [PTSD]' (*ibid.*: 402). Thus, Galea argues elsewhere, 'different aspects of the urban environment are distinctly and variably linked to brain structure, function, and hence phenotype' (2011: 859). In schizophrenia, the diagnosis most consistently associated with urbanicity, Roth and her colleagues (2009), noting the higher prevalence of 'socio-economic risk factors' for the development of schizophrenia in urban environments, suggested that these factors may have a direct influence on the down-regulation of genes implicated in the production of GABAergic neurons that help to control 'over-excited' neuronal activity (reduced GABA function has been consistently associated with some of the core symptoms of schizophrenia). Thus as Jim van Os and his group point out, schizophrenia research is moving outwards, from an internalised attention to the genome, or even the proteome – to the role of the 'schizophrenia envirome' (2005).

A different dimension of this research, centred around the German psychiatrist and neurologist Andreas Meyer-Lindenberg, has tried to identify the neural processes that mediate the link between urban life and psychiatric disorder. In a series of experiments, Florian Lederbogen

(2012) and his colleagues were able to associate both current city living, and city upbringing, with distinctive patterns of neural activity in response to stress. Their suggestion is that social-stress-processing (produced by exposure to ‘pollution, toxins, crowding, noise, or other demographic factors’) is the environmental risk that links city life to mental ill-health. This stress processing is embodied, they assert, in specific, predictable patterns of stress-related neural activity, sometimes resulting in an organic pathology (2011: 500). ‘A new generation of field studies is warranted,’ argue Meyer-Lindenberg and Tost elsewhere, ‘that combine the acquisition of neuroimaging and biomarker data with experience-based assessment, mobile neuropsychological testing and tracking of subjects in spatially and socially well-defined real-life contexts’ (2012: 666). An approving write-up in *Nature* suggested that ‘as well as helping in the design of future cities, such work might also pinpoint the most stressful parts of an existing metropolis — and help to make a case for urban regeneration’ (Abbott, 2012: 164). Sociologists may point to many limitations in the way that this research conceptualises and operationalizes social experience. But what distinguishes these projects is that they do not think in terms of a binary division between social life and the body, and seek to allocate cause and consequence between them. Instead, they explore mutually constitutive relationships, by means of which particular forms of social life get *under the skin* and back out again (Harrington, 2008) – that is to say, they seek the biological traces of social relations, and the ways in which the politics of urban space is rendered corporeal.

How can we account for the revival of interest in these transactions? One answer might be the simple fact of urbanization: one half of the world’s population now lives in urban areas - although of very different types - bringing new attention to the kinds of disorders that flourish in such environments, not least those of mental health (Galea *et al* 2011). A second might be the discrediting of the ‘urban drift’ hypotheses of mental disorder (Cooper *et al*, 2005: 331). But we stress a third answer: the rise of several related ‘post-genomic’ fields of research such as population-based epigenetics, group selection, and studies of mediations between neural pathways and social cognition (Author 3, 2012; Author 2, 2013; Meloni, *in press*). These have given scholars from different disciplines reason to think again about the complexity of the entanglement between the body and its environment.

We do not wish to seem naively laudatory of this research. Nor do we want to imply that there are simple parallels between these developments and those of seventy-five years ago. Nor is it our aim to exhort sociologists to invest *en masse* in these socially-inflected biological projects. But we do wish to provoke interest in a ‘re-vitalized’ sociology that goes well beyond sociological attention to the body (Martin, 1992; Shilling, 2007), and/or current highly theoretical debates over affect (Leys, 2011; Wilson and Frank, 2012) We want to imagine a highly empirical sociology,

attentive to and engaged in contemporary research in the life sciences; focused on the key historical problems of the discipline; and much more ontologically ambitious than the epidemiological demonstration of the 'social determinants' of health. It is not, here, a case of sociology jumping on a neurobiological bandwagon: the point is that this approach takes inspiration from a longer intellectual history of the social sciences, where sociology has not been a passive service discipline, but a pioneer, risk taker and intellectual leader.

## Intersection

In this final section we outline four areas where sociologists may profitably think about renewed forms of engagement with the life sciences, and with their imagination of the relationship between mental life and the city.

### (1) *Bioeconomies of urban experience*

Even in sophisticated epigenetic and neurobiological accounts of urban mental illness, the elaboration of the social environment gets scant attention. For Galea and his colleagues, the social aspects of the city are, 'concentrated disadvantage, residential segregation and social norms' on the one hand, and 'certain environmental toxins such as community violence, second-hand smoke and air pollution,' on the other (2011: 400, 402). For Meyer-Lindenberg and Tost, it is 'disintegration of family networks, tightened competition and discrimination' (2012: 664). This is clearly insufficient to grasp the characteristics of the milieu that should concern us. One of the signatures of Faris and Dunham's naturalistic approach to carefully-circumscribed urban zones, and of their 'sifting and sorting of economic and social institutions and of populations within them,' was the thickness of its attention to place, and its commitment to being immersed in delicately-understood urban districts (1930, 4; cf. Sassen, 2000: 146). A similarly ecological attention to the contingency of real urban areas, to what Park (1936) calls the 'biotic' and 'cultural' dynamics that make them up, moves us beyond sterile epidemiological abstractions like 'SES,' 'disadvantage,' and 'disintegration,' but without abandoning a commitment to some kind of comprehensible – even quantifiable – stream of biosocial phenomena at the heart of urban life.

The ecological standpoint has been criticised for papering over the ideological and political decisions that underpin specific urban arrangements. But we can nonetheless conceive of a more 'naturalistic' sociological attention that is attentive to actual experiences of poverty, and pain, as well as to the political economies that sustain those states. Park once approvingly cited HG Wells' description of human ecology as mere "biological economics" (1936: 11). But we urge attention to the ways social experience is lived biologically, and the need to develop both concepts and methods

to understand and describe biological forms of human life that emerge within, and are reproduced by, specific kinds of social, political economic relations. A shared sociological and neuropsychiatric attention to such a *bioeconomy of urban experience* might open up the specificity of the relations between capital, biology, and mental distress in the city.

## (2) *The curative potential of life-as-such*

It often seems that what is offered by genomic and neurobiological accounts of the consequences of urban living is simply a biological mechanism that underpins phenomena that are already well known and well understood at other scales (*cf.* Pickersgill, 2013: 433). That is, of course, not nothing. But there is thus an understandable sociological concern that introducing biological markers of poverty and class, may rapidly lead to researchers and policy makers according them a causal status in the production of disorder, and may shift attention towards the affected individual, and away from the way that illnesses are produced and distributed by social, political, and economic phenomena. Thus critics of 'biomedicalization' suggest that it will be the sick body that gets burdened with a curative responsibility, and not the pathogenic social forms that produce that body (Clarke *et al.*, 2010).

Yet the thrust of the work of Faris and Dunham (1939) and Hollingshead and Redlich (1958) was precisely to trouble any sense of meaningful distinction between social and biological life in pathogenesis. The point, as Hollingshead and Redlich remind us, is to 'attempt relentlessly to isolate biological, psychological, and social factors *in their dynamic interactions*' (1958: 9, our emphasis). Didier Fassin's attention to 'life as such' may help us here: 'life as the course of events which occurs from birth to death, which can be shortened by political or structural violence, which can be prolonged by health and social policies, which gives place to cultural interpretations and moral decisions, which may be told or written – life which is lived through a body (not only through cells) and as a society (not only as species)' (Fassin, 2009: 48). A re-vitalized sociology must insist that cure should not only focus on the biological constraints of life, but on the way in which living 'simultaneously shapes and is shaped by the political choices and moral economies of contemporary societies' (*ibid.*: 48). Of course such an approach runs well known risks of eliding the distinctions between harm, pathology, disease, and politics. But in our view, those risks do not outweigh the potential for a new 'politics of life' – one that that re-shapes our therapeutic and interventionist imaginary, such that the social life of the city and the molecular life of the body do not compete for priority but become mutually entangled within a much more complex, and thickly-textured landscape of empirical research into the distribution of suffering, restoration and care.



### (3) *Dappled ontologies of disease*

Especially within epigenetically-motivated accounts of urban mental health, the elements of ‘the environment’ are sometimes curiously undifferentiated. Schizophrenia, for example, is associated with cannabis use (Van Os *et al.*, 2010), air pollution (Davis *et al.*, 2012), migration (Roth *et al.*, 2009), winter-birth (O’Callaghan *et al.*, 1991), and so on. Similarly, even within a single study, we earlier quoted Galea and his colleagues’ attention to what they called ‘certain environmental toxins’ – which they named as ‘community violence, second-hand smoke and air pollution’ (2011: 402). But the category of ‘environmental toxins’ does not do a good job of holding together such disparate things as violence and smoke – let alone winter, migration, and cannabis. Even ‘violence’ itself is a baggy sort of thing: what Galea *et al.* mostly intend by this term is localised physical violence – but less attention is paid to the structural violence of urban planning and housing policy, to the psychological violence of police and local-government surveillance, to the racialized violence of urban neglect, and so on.

If we are enthusiastic about attempts to think the place of the social environment in the development of mental disorder, nonetheless, as Landecker and Panofsky point out, the risk is that ‘a certain ontological flattening occurs,’ in which ‘different categories of things in the world are made equivalent by recasting them as different forms of exposure’ (2013: 341). Clearly, there is a role for a more comprehensively sociological attention to the nuances of the environment, and to the politics of spatilized exposure – a perspective that may not be radically distinct from the ecological zones identified by scholars of an earlier era. But we also suggest a broader role for sociology in thinking more comprehensively about the ontology of disease, and its relationship to the social environment: in place of an epidemiological flatness, what would a thicker ontology of urban mental health look like? We are reminded, here of Nancy Cartwright’s (1994) view of a ‘dappled’ world – which, for Cartwright, allows us to enjoy a kind of realism without committing to a narrow and law-like universalism. For the empirical sociology of the contemporary city, then, our interest in how such a ‘dappled’ perspective could help sociologists, pursuing the make-up of psychiatric disease, to track the dynamics of flow and exchange between such disparate objects as poverty, race, accommodation, smoke, violence, and winter birth. Can we imagine a simultaneously sociological and psychiatric perspective that would allow to think the local traffic between such nodes; that would attend to the assemblages of mental suffering and distress that they help to make up; but that would also help to identify simultaneously biological and socio-political matrices of harm-reduction and intervention?

#### *(4) Biological localities*

We have talked about 'the city' a lot in this paper – but there is, as the British science fiction author China Miéville (2011) reminds us, 'the city and the city.' It is striking for example, the kinds of cities that are the loci of studies like these – for example Glasgow (McGuinness *et al.*, 2011), Detroit (Galea *et al.*, 2011), Atlanta (Smith *et al.*, 2011) – all with long and racialized histories of poverty; often with collapsed manufacturing bases; physically and emotionally distant from metropolitan centres of wealth and power, and so on. It is also important to consider how this research will be torqued as it moves into the cities of the global south. But it is especially the topography of Faris and Dunham's Chicago that reminds us how 'the city' is not always 'the city.' In their work, it is the American city of the war years that is in question, with power and capital flowing to the suburbs, with migration from South to North, with localized booms in heavy manufacturing, with increasing desolation of the inner cities, and so on. How can a sociological attention to the specificity of 'the city,' and to the complex local histories of specific urban territories, intersect with biological research on urban life in general? How, will such an attention help these new insights interact with research underway in the cities of the global south (Andrade *et al.*, 2011)?

Some years ago, the anthropologist Margaret Lock (2001) proposed the idea of 'local biologies' to show how biological difference might produce a very a different kind of subjective experience – which would, in turn, produce shifts in the way that local worlds are both made and made sense of. Lock's coinage is a valuable contribution to thinking the intersection of body and space. But we wonder if we might not draw a more spatial orientation within Lock's suggestion, by reversing the polarity of these terms, and thus beginning to scale the city in terms of its 'biological localities.' Could a simultaneously sociological and psychiatric research project gain anything by re-imagining the city as a complex and layered landscape of epigenetic districts, embodied neighbourhoods, and neurobiological streets? Could we use the image of a biological locality to re-think the sociological dynamics of specific and located urban spaces – especially as those dynamics work to map and re-map exchanges of power and capital, of surveillance and security, of stress, experience, and feeling, and sickness? We suggest that an attention to mapping such specific, local relationships between bodies and territories might, once again, generate the space for a revitalized sociology to contribute to biomedical knowledge on urban mental health.

## **Conclusion**

In this paper, we have explored some of the ways in which the relationship between mental life and the metropolis has been understood by a variety of disciplines, over the last century or so, from epidemiologists, to ecological sociologists, to epigeneticists, and neurobiologists. We have overlain

this history with a story of how researchers, from different traditions, have understood, enacted, and resisted, interactions between the social sciences and the life sciences. Of course there are complications to this account. We are conscious of earlier attempts at crossing the social and life sciences, not least the work of Bénédict Morel, where, amid widespread concerns about urban degeneracy, character, constitution, life forms and experience were inextricably interwoven (Pick, 1989). And yet the work that we have described here gives us hope that relationship between urban life and mental health might prove a key testing-ground for re-vitalizing sociological research (that is: a sociology for which the unfolding of biological life is a key site of interest), *and* for culturing molecular biology (that is: a biology in which the shifting texture of not just 'social' but of *sociopolitical* life, in all its richness, complexity, diversity, and contest, is taken as a central interpretive tool for molecular styles of thought). History, here, is not merely a preamble, but a means of understanding some of the *ways in* which, *contexts for* which, and *stakes in* which, this relationship might be developed. Following Landecker and Panofsky (2013: 347), a revitalized sociology is one that, in this instance, would not point gesturally to 'the environment', but would explore more seriously and empirically the ways in which we can connect expertise in the political economy of urban housing, employment and policing to what we know about the stratification of biological expressions of stress, *and* the political, economic, cultural developments that produce a measurable effect on those expressions. That work is now underway, but much refinement is needed. The history of sociology's encounter with mental life in the metropolis might be an unexpectedly rich resource for thinking about those refinements might look like.

We are utterly committed to the view that there is no role for sociology as an add-on, or a 'service' discipline here. Precisely the opposite: the history of these connections teaches us that it is precisely a sociological form of attention that can help to thicken and *enliven* the connections that clinicians, epidemiologists, and neurologists are tracking between mental health and the metropolis. Recalling the invitation from the editors of *Nature*, our goal is to think about what that older sociology – with all its problems, but bursting with vitality nonetheless – can contribute to contemporary efforts to understand the profoundly emergent and biosocial texture of so much mental distress. The dominant idioms through which sociologists have interpreted, and continue to interpret, these developments in the life sciences – biologisation, medicalization, problematization – will have little to contribute to that effort. A new language is required; in this paper, we have tried to sketch some of its elementary terms.

## Bibliography

**Abbott, A.** 2012 'Stress and the City: Urban Decay', *Nature* 490(7419): 162–164.

**Andrade, L.H.** et al. 2012 'Mental Disorders in Megacities: Findings from the São Paulo Megacity Mental Health Survey, Brazil', *PLoS ONE* 7(2): e31879.

**Author 2.** 1999

**Author 2.** 2013

**Author 3.** 2012

**Bahn, A. K., Chandler, C.A., and Eisenberg, L.** 1961 'Diagnostic and demographic characteristics of patients seen in outpatient psychiatric clinics for an entire state (Maryland): implications for the psychiatrist and the mental health program planner', *American Journal of Psychiatry* 117(9): 769–778.

**Benton, T.** 1991 'Biology and Social Science: Why the Return of the Repressed Should Be given a (Cautious) Welcome', *Sociology* 25(1): 1–29.

**Blackman, L.** 2012 *Immaterial Bodies: Affect, Embodiment, Mediation*, London: Sage

**Bloom, B.L.** 1968 'An Ecological Analysis of Psychiatric Hospitalizations', *Multivariate Behavioral Research* 3(4): 423–463.

**Bulmer, M.** 1986 *The Chicago School of Sociology: Institutionalization, Diversity, and the Rise of Sociological Research*, Chicago: University of Chicago Press.

**Burr, R.H.** 1903 'A Statistical Study of Patients Admitted at the Connecticut Hospital for Insane from the Years 1868 to 1901', *Publications of the American Statistical Association* 8(62): 305–343.

- Cartwright, N.** 1999 *The Dappled World: A Study of the Boundaries of Science*, Cambridge: Cambridge University Press.
- Castells, M.** 1977 *The Urban Question: A Marxist Approach*. London: Edward Arnold,.
- Gieryn, T.F.** 2000 'A Space for Place in Sociology', *Annual Review of Sociology* 26: 463–496.
- Clarke, A.E., et al.** 2003 'Biomedicalization: Technoscientific Transformations of Health, Illness, and U.S. Biomedicine', *American Sociological Review* 68(2): 161–194.
- Conk, M.** 1987 'The 1980 Census in Historical Perspective' in W. Alonson and P. Starr (eds.) *The Politics of Numbers*, New York: Russell Sage.
- Cooper, B.** 2005 'Immigration and Schizophrenia: The Social Causation Hypothesis Revisited', *The British Journal of Psychiatry* 186(5): 361–363.
- Davis, D.A. et al.** 2013 'Prenatal Exposure to Urban Air Nanoparticles in Mice Causes Altered Neuronal Differentiation and Depression-Like Responses', *PLoS ONE* 8(5): e64128.
- Dear, M.** 2002 'Los Angeles and the Chicago School: Invitation to a Debate', *City & Community* 1(1): 5–32.
- Dunham, H.W.** 1966 'Eidemiology of Psychiatric Disorders as a Contribution to Medical Ecology', *Archives of General Psychiatry* 14(1): 1–9.
- Faris, REL, and HW Dunham.** 1939 *Mental Disorders in Urban Areas: An Ecological Study of Schizophrenia and Other Psychoses*, Chicago: Chicago University Press.
- Fassin, D.** 2009 'Another Politics of Life Is Possible', *Theory, Culture & Society* 26(5): 44–60.
- Frank, A, and Wilson, E.A.** 2012 'Like-Minded', *Critical Inquiry* 38: 870–877.
- Freese, J, and Shostak, S.** 2009 'Genetics and Social Inquiry', *Annual Review of Sociology* 35(1): 107–128.

- Galea, S.** 2011 'The Urban Brain: New Directions in Research Exploring the Relation between Cities and Mood–Anxiety Disorders.' *Depression and Anxiety* 28(10): 857–862.
- Galea, S., Uddin, M., and Koenen, K.** 2011 'The Urban Environment and Mental Disorders: Epigenetic Links', *Epigenetics* 6(4): 400–404.
- Goldstein, M.S.** 1979 'The Sociology of Mental Health and Illness', *Annual Review of Sociology* 5(1): 381–409.
- Grob, G N.** 1985 'The Origins of American Psychiatric Epidemiology', *American Journal of Public Health* 75(3): 229–236.
- Gross, M.** 2004 'Human Geography and Ecological Sociology The Unfolding of a Human Ecology, 1890 to 1930—and Beyond.', *Social Science History* 28(4): 575–605.
- Hare, E. H.** 1955 Mental Illness and Social Class in Bristol. *British Journal of Preventive & Social Medicine* 9(4): 191–195.
- Harrington, A.** 2008 *The Cure Within: a History of Mind-Body Medicine*, New York: W.W. Norton
- Hayes, E.C.** 1911 'The 'Social Forces' Error', *American Journal of Sociology* 16(5): 613–625.
- Hollingshead, A.B. and Redlich, F.C.** 1958 *Social Class and Mental Illness: A Community Study*. London: Wiley.
- Horwitz, A.V. and Grob, G.N.** 'The Checkered History of American Psychiatric Epidemiology' *Milbank Quarterly* 89(4): 628–657
- Jackson, S., and Rees. A.** 2007 'The Appalling Appeal of Nature: The Popular Influence of Evolutionary Psychology as a Problem for', *Sociology* 41(5): 917–930.
- Kleinman, A.** 2008 *Rethinking Psychiatry*, New York: Simon and Schuster.

**Lederbogen, F.** et al. 2011 'City Living and Urban Upbringing Affect Neural Social Stress Processing in Humans', *Nature* 474(7352): 498–501.

**Lemke, T.** 2004 'Disposition and Determinism – Genetic Diagnostics in Risk Society', *The Sociological Review* 52(4): 550–566.

**Leys, R.** 2011 'The Turn to Affect: A Critique.' *Critical Inquiry* 37(3): 434–472.

**Lock, M.** 2001 'The Tempering of Medical Anthropology: Troubling Natural Categories', *Medical Anthropology Quarterly* 15(4): 478–492.

**Malzberg, B.** 1930 'Mental Disease and 'the Melting Pot'', *Journal of Nervous and Mental Disease* 72(4): 379–395.

**March, D.** et al., 2008 'Psychosis and Place', *Epidemiologic Reviews* 30(1): 84–100.

**Martin, E.** 1992 'The End of the Body?' *American Ethnologist* 19(1): 121–140.

**McGuinness, D.** et al. 'Socio-Economic Status Is Associated with Epigenetic Differences in the pSoBid Cohort', *International Journal of Epidemiology* 41(1): 151–160.

**Meaney, M.J.** 2001 'Maternal Care, Gene Expression, and the Transmission of Individual Differences in Stress Reactivity Across Generations', *Annual Review of Neuroscience* 24(1): 1161–1192.

**Meyer-Lindenberg, A. and Tost, H.** 2012. 'Neural Mechanisms of Social Risk for Psychiatric Disorders', *Nature Neuroscience* 15(5): 663–668.

**Mintz, N.L and Schwartz, D.T.** 1964 'Urban Ecology and Psychosis: Community Factors in the Incidence of Schizophrenia and Manic-Depression among Italians in Greater Boston', *International Journal of Social Psychiatry* 10(2): 101–118.

**Mueller, J. H.** 1940 'Review of Mental Disorders in Urban Areas: An Ecological Study of Schizophrenia and Other Psychoses', *The Journal of Abnormal and Social Psychology* 35(4): 593–594.

**Myerson, A.** 1940 'Mental Disorders in Urban Areas. An Ecological Study of Schizophrenia and Other Psychoses' *American Journal of Psychiatry* 96(4): 995–997.

**Nature**2012 'Life Stresses', *Nature* 490(7419): 143.

**O'Callaghan, E. et al.** 1995 'Confinement of Winter Birth Excess in Schizophrenia to the Urban-Born and Its Gender Specificity', *The British Journal of Psychiatry* 166(1): 51–54.

**Park, R.E.** 1936 'Human Ecology', *American Journal of Sociology* 42(1): 1–15.

**Pick, D.** 1989 *Faces of degeneration: a European disorder c.1848-c.1918*. Cambridge, Cambridge University Press.

**Pickersgill, M., et al.** 2013 'Mapping the New Molecular Landscape: Social Dimensions of Epigenetics', *New Genetics and Society* 32(4): 429–447.

**Pilgrim, D., and Rogers, A.** 2005 'The Troubled Relationship between Psychiatry and Sociology', *International Journal of Social Psychiatry* 51(3): 228–241.

**Pollock, H.M.** 1922. 'Mental Disease in the United States in Relation to Environment, Sex and Age', *American Journal of Psychiatry* 82(2): 219–232.

**Robinson, W. S.** 2009 'Ecological Correlations and the Behavior of Individuals', *International Journal of Epidemiology* 38(2): 337–341.

**Roth, T.L. et al.** 2009 'Epigenetic Mechanisms in Schizophrenia', *Biochimica et Biophysica Acta - General Subjects* 1790(9): 869–877.

**Rowitz, L, and Levy, L.** 1968 'Ecological Analysis of Treated Mental Disorders in Chicago.' *Archives of General Psychiatry* 19(5): 571–579. doi:10.1001/archpsyc.1968.01740110059007.

**Sassen, S.** 2000 'New Frontiers facing Urban Sociology at the Millennium', *The British Journal of Sociology* 51(1): 143–159.

**Schatzman, L., and Strauss. A.** 1966 'A Sociology of Psychiatry: A Perspective and Some Organizing Foci', *Social Problems* 14(1): 3–16.



**Schroeder, C.W.** 1942 'Mental Disorders in Cities', *American Journal of Sociology* 48(1): 40–47.

**See, J.J., and Mustian, R.D.** 1976 'The Emerging Role of Sociological Consultation in the Field of Community Mental Health', *Community Mental Health Journal* 12(3): 267–274.

**Shilling, C.** 2007 'Sociology and the Body: Classical Traditions and New Agendas', *The Sociological Review* 55: 1–18.

**Smith, A. K et al.** 2011 'Differential Immune System DNA Methylation and Cytokine Regulation in Post-Traumatic Stress Disorder', *American Journal of Medical Genetics. Part B* 156B(6): 700–708.

**Smith, D.A.** 1995 'The New Urban Sociology Meets the Old: Rereading Some Classical Human Ecology.' *Urban Affairs Review* 30(3): 432–457.

**Srole, L.** 1977. *Mental Health in the Metropolis: The Midtown Manhattan Study: Vol. 2.* New York: Harper & Row.

**United States Bureau of the Census** (1914) *Insane and Feeble-Minded in Institutions 1910.* Washington: Government Print Office.

**Van Os, J., Kenis, G., and Rutten, B.P.F.** 2010 'The Environment and Schizophrenia', *Nature* 468(7321): 203–212.

**Wing, J.K.** 1980 'Social Psychiatry in the United Kingdom: The Approach to Schizophrenia', *Schizophrenia Bulletin* 6(4): 556–565.

**Wolch, J., and Philo, C.** 2000 'From Distributions of Deviance to Definitions of Difference: Past and Future Mental Health Geographies', *Health & Place* 6(3): 137–157.