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Evolution of the "parks as lungs" metaphor: is it still relevant?

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ABSTRACT

Conceptualizing urban parks as "the lungs of the city" is one of the parks field's most enduring metaphors. Indeed, it is often uttered unthinkingly as a cliché. Its roots date back over 200 years. The reason it was so widely adopted in the nineteenth century is that it was unusually powerful and resonant in the context of the ubiquitous filth and stench in the industrial cities where it originated. This paper describes the conditions which fostered the metaphor; explains its private and public good dimensions; traces its genesis and diffusion, including its transition from England to the US and concludes with an assessment of its potency in contemporary society.

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The role of miasmas in the evolution of urban parks was discussed in an earlier article in this journal (Crompton, 2013). Miasmas were defined as "noxious emanations carried in and by the air" (Cartwright, 1977, p. 198). They emanated from the filth, squalor and stench which were ubiquitous corollaries of the rapid growth cities emerging from the industrial revolution. Miasmas were the prevailing explanation for disease in the first two-thirds of the nineteenth century. Miasmatic theory was vague about the physiological processes that caused disease, which led to them being variously described and defined by multiple authorities. This vagueness meant the theory was sufficiently malleable that it could be used to explain all manner of diseases, which was part of its appeal.

As the world's first industrialized state, Britain became its most heavily urbanized one. Prominent among the epicenters of Britain's industrial revolution were Manchester and Liverpool, while London as the greatest city in the world was "the source of prodigious novelty and invention" (Joyce, 2003, p. 9). It was in these cities that the concept of urban public parks accessible to all citizens was primarily nurtured. The "parks as lungs" metaphor was prominently used in public debates at the outset of this movement, and it appears to have been effective in communicating the "anti-miasmas" rationale for urban parks (Crompton, 2013).

Urban parks emerged in the UK approximately 15 years before they were developed in the east coast cities of the US, where conditions resembled those in the UK (Corburn, 2009). The urban parks movement also quickly migrated to Australia and subsequently

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to many other countries. Indeed, it has been suggested that it was an early example of globalization (Joyce, 2003). The lungs metaphor transferred seamlessly to the new contexts.

Using analogies with the human system to illustrate natural processes was a dominant paradigm in the early nineteenth century (Davison, 1983). They were both seen as systems which were replenished with fresh "particles" and by the elimination of waste ones. The use of the human metaphor was well illustrated by Dr Neil Arnott, who was recognized as London's leading medical authority, in his influential treatise *Elements of Physics* which went through six editions in his lifetime:

> We know that as the Thames water spreads over London in pipes, to supply the inhabitants generally, and to answer the particular purposes of brewers, bakers, tanners and others, and is then in great part returned to where the current sweeps away the impurities: so, nearly, in the human body, does the blood spread in the arteries from a central vessel in every direction, to nourish all the parts and to supply such material of secretion to the liver, the kidneys, the stomach and other viscera, and returns from these by the veins, towards the heart and lungs, to be purified, and to have its waste replenished, that it may again renew its course. (1833, p. 452)

Joyce (2003) points out: "The sanitary economy of the town was like that of the body. Both were characterized by a dynamic equilibrium between living organisms and their physical environments" (p. 65). Cities exhibited subtle mechanisms or adjustment of homeostasis, which regulated their social health just as temperature, circulation, digestion and respiration were maintained in the body (Davison, 1983).Thus, the widely accepted medical theory of "vital process" promulgated by Dr Thomas Southwood Smith, the central intellectual figure in sanitary reform, involved viewing individual human bodies as being composed of constituent "particles"; the social body in turn was made up of "the entirety of the particles entering and leaving all living creatures" (Joyce, 2003, p. 65).

Southwood Smith's bifurcated explanation of disease as having both individual and communitywide dimensions was captured in the parks as lungs metaphor. Lungs bring oxygen into the body to provide energy, and remove carbon dioxide the waste product created when energy is expended. Thus, as a "private good" at the individual level, the metaphor suggested that parks were a safe and healthy place to exercise. At the same time, as rare oases of vegetation in the dense industrial urban areas, parks performed a "public good" communitywide function. They were the breathing organs of the city, analogous to lungs in the human body. Like lungs, vegetation provides oxygen, while removing carbon dioxide and other industrial pollutants from the atmosphere.

These two dimensions of the metaphor were recognized in 1839 in a *Blackwood's Magazine* article, "The Lungs of London": "The Lungs of London – the great vehicles of exercise, fresh air, health and life to the myriads that congregate in the great metropolis" (Murray, 1839, p. 226). Similarly, in 1841 *The Mirror of Literature, Amusement, and Instruction* observed: "The advantages [of a plan to create parks in London] are twofold. It affords opportunity of healthy exercise, and it purifies in some measure the air of the surrounding district" (p. 43). While both the individual and communitywide dimensions of the metaphor were acknowledged, it will be clear from the discussion of the metaphor's genesis and diffusion later in the paper that it was the communitywide dimension around which most support for parks coalesced. The metaphor pithily captured the essence of the medical advocacy that was influential in the social and political actions which created urban parks.

Since many of the influential advocates for urban park were medical men – Thomas Southwood Smith, Neil Arnott, William Farr, William Duncan, James Kay-Shuttleworth in England, and John Griscom and John Rauch in the US or were lay students of physiology like Edwin Chadwick in England and Lemuel Shattuck in the US – it was likely their conceptualization of how cities function would strongly reflect contemporary views of human physiology and medical practice (Davison, 1983).

The paper commences with an overview of conditions in the industrial cities. Next the metaphor's private meaning is described, followed by a discussion of its public dimension of alleviating disease and epidemics. The genesis and diffusion of the metaphor is tracked, including its transition to the US. The concluding section assesses its potency in the context of contemporary society.

The nineteenth century frames the discussion, because the metaphor was a creature of the miasmas explanation of disease. By the 1880s/1890s, it was recognized that miasmas failed to explain why, when filth was ubiquitous, epidemics occurred only sometimes and in some places. It offered a theory of how disease traveled, but not where it came from (Corburn, 2009). As germ theory replaced it as the explanation for disease, the influential support of the medical community for urban parks waned. Medical treatment gradually superseded advocacy for environmental actions which had been the *raison d'être* for the parks as lungs metaphor. Public health shifted towards interventions aimed at limiting bacteria, the instigation of compulsory vaccinations for school-age children and chlorination of drinking water supplies (Corburn, 2009).

The lungs metaphor has a 200-year-old lineage. It remains ubiquitous in contemporary planning documents and discussions of urban parks. A brief search revealed its recent use in, for example: the US in New York City (Birch & Cipolla, 2013; Powell, 2013), San Francisco/Oakland (Walker, 2009) and Chicago (Scheer, 2001); Manchester, UK (Smith, 2006); Nairobi, Kenya (Friends of City Park, 2012); Johannesburg, South Africa (Johannesburg City Parks, 2013); Kadma, India (Bisoee, 2013); Rawalpindi, Pakistan (Yasin, 2008) and Mexico City (Rockower, 2009).

The context: squalor and filth

A consequence of the intense overcrowding, the unplanned jerry-built dwellings, and the squalor of the industrial cities was filth and a stench which were pervasive in homes, courts, yards and streets. The filth and stench came from three sources. First, the industrial factories, mills and workshops:

> Each trade – tar works, jam factories, cement works, chemical works, glue factories, knackers' yards, tallow and candle works, tripe boilers, bone boilers, fell mongers, manure works, slaughter houses, and many more – had its own distinctive stench which either hung over a district giving it a unique and immediately recognizable odour, or mingled with others into an offensive mélange which pervaded the entire town. (Wohl, 1983, p. 206)

A second source was the carriage horse dung on roads which were described as "streams of mud and filth in winter" and "seas of dust" in summer (Great Britain Poor Law Commissioners, 1842, p. 59). In addition, streets were the unofficial depository for filth from industrial and residential sources. Thus, one medical officer reported that the poor, "Were in the habit of depositing their excreta in a newspaper, folding it up, and throwing

it with its contents out of a back window" (Wohl, 1983, p. 87). In many locales, the tradition was to empty chamber pots into the street in the night hours.

Third, the most disgusting and pervasive odours came from residential filth. Most cities had no sewage system of any kind. Cesspools, which were holes in the ground, were the most common depositaries for excrement disposal from dwellings. They were intended to be temporary receptacles for sewage that would be regularly emptied. However, often they were not regularly emptied, so they overflowed, saturating adjoining land, seeping into the cellars of dwellings and polluting the wells from which most houses got their water.

The magnitude of the filth is difficult both to overstate and to comprehend. This was noted by Thomas Southwood Smith in his testimony to the 1840 Health of Towns Select Committee:

> It is utterly impossible for any description to convey to the mind an adequate conception of the filthy and poisonous condition in which large portions of all these districts constantly remain; an adequate conception of this can be obtained only by an actual inspection of them. (Health of Towns, 1968, p. 220)

Although miasmatic theory in the first two-thirds of the nineteenth century was regarded as axiomatic, it was entirely erroneous. Nevertheless, even though Louis Pasteur described germ theory in 1862, which identified microbes as the specific agents that caused disease, this did not gain wide acceptance quickly among physicians. Miasmatic theory continued to dominate medical thinking about disease until the late 1880s when germ theory gradually displaced it. Southwood Smith, published his *Treatise on fever* in 1830 in which he explained that miasmal atoms could be absorbed either through inhalation or through skin contact. He argued that miasmas caused diseases in two ways. Their "predisposition" role weakened the body's resistance to disease so it "brings the body into a condition capable of being affected by the "immediate or exciting role which produces the disease" (p. 217). The "predisposition" and "exciting" roles purported to explain the difference between sickness and the epidemic fevers of cholera, typhoid, typhus, yellow fever and so on. If the predisposition weakening deteriorated to a point "where the power of resistance is less than the power of the poison" (p. 217), then the sickness morphed into one of the epidemic fevers. The apparent ability of miasmatic theory to explain all manifestations of illness, from minor sickness to major epidemic, through its predisposition and exciting roles meant the argument was "adaptable to the many manifestations of illness and helped to explain the degree to which certain individuals were more susceptible than others" (Szczygiel & Hewitt, 2000, p. 712).

In his *Treatise*, Southwood Smith did not pretend to understand the modus operandi of the miasmas, "We know nothing beyond its power to strike the human being with sickness or death" (p. 205), but was confident of its source: "Vegetable and animal matter, during the process of putrefaction, give off a principle, or give origin to a new compound, which when applied to the human body, produces the phenomena constituting fever" (p. 205), "what this principle or compound is … we are wholly ignorant" (p. 205). Elsewhere, Southwood Smith offered a speculative explanation on how miasmas might work: "They are carried by the air, inspired to the air-cells of the lungs, the thin delicate membranes of which they pierce, and thus pass directly into the current of the circulation" (Parliamentary Papers, 1846, p. 651).

The private dimension of parks as lungs

Walking for its own sake and for the pleasure of being in a pleasing landscape, as a complement to walking for utilitarian purposes, emerged in the UK in the late eighteenth century. The great sages if the late eighteenth century were country gentlemen and their writings exhibited the harmony they perceived in nature. The renowned poet William Wordsworth's accounts were prominent among them. His long walks from his Grasmere cottage in the Lake District have been credited with popularizing walking. He has been described as its "founding father" (Solnit, 2000). His friend and fellow poet Samuel Coleridge estimated that Wordsworth walked 180,000 miles during his adult life and he championed protection of the public footpaths and rights-of-way during the enclosure movement. The theme of walking was pervasive in his extensive portfolio of poetry and his poems were widely disseminated in the first half of the nineteenth century (Wallace, 1994). Hence, "A cultural framework arose [from Wordsworth's walks] that would inculcate such tendencies in the wider public … It is impossible to overemphasize how profound is the effect of this revolution on the taste for nature and the practice of walking" (Solnit, 2000, p. 83). These beginnings led to "making places to walk, places that became larger and more culturally significant" (p. 86).

However, there was a big difference between establishing a walking culture in picturesque rural areas among the relatively wealthy, well-educated "intellectual classes" and inculcating a walking culture among the working classes in industrial cities. As Murray (1839) observed, "Genteel people are abundantly provided for" with private parks, estates and access to the countryside, "with the poor artisan and laboring man it is not so" (p. 227). Wordsworth recognized that "walking in the city [was] a perilous business" (Wallace, 1994, p. 22), because there was no separation of street and sidewalk and no street crossings, "The pedestrian had to fight his or her way in a crowded area" (Joyce, 2003, p. 205). The prevailing stench and the physical tumult of city streets meant that walking was neither pleasant nor safe. For it to flourish in the cities, locations dedicated for that purpose were needed.

The legislative champion of the effort to accomplish this was Robert A. Slaney, MP for Shrewsbury. During his 30 years in Parliament (1826–1841 and 1847–1862), he was unrelenting in his commitment to establish urban parks. His efforts were first rewarded in 1833 when he persuaded Parliament to establish the Select Committee on Public Walks and to appoint him as its chairman. The Committee's report noted "little or no provision has been made for Public Walks or Open Spaces, fitted to afford means of exercise or amusement to the middle or humbler classes" (p. 1). It stated: "It must be evident that it is of the first importance to their [Working Classes] health on their day of rest to enjoy the fresh air, and to be able (exempt from the dust and dirt of public thoroughfares) to walk out in decent comfort with their families" (p. 9). It recommended "that Public Walks be gradually established in the neighborhood of every populous town in the Kingdom" (p. 11).

Public walks was the focus of their report, rather than parks per se. They were criticized for this: "In one respect the Committee did not go far enough … Public *grounds*, not *walks,* are the things wanted" (Westminister Review, 1834, p. 513). Nevertheless, the report marked the first serious effort in the UK to secure public funding for open space. For this to occur, however, towns needed enabling authority to incur the long-term debt supported by local tax money that was needed to develop parks. Slaney envisioned that the

report would recommend funding. In his motion to establish the Committee he suggested, "That any town raising a sum by subscription or otherwise for the purpose of building public walks should receive a certain proportion of money from the public Treasury" (Hansard, 1833, cc 1055). However, such a proposal was not part of the Select Committee's final recommendations.

The "public walks" nomenclature implied early legislators believed that as part of their "lungs" function, public parks would encourage walking. Hence, city dwellers would get the benefits of exercise, as well as the benefits accruing from their exposure to clean air. Pettigrew (1937) observed:

> Public Walks employed in the 1848 Public Health Act implies that the ideal in the minds of legislators … was that these grounds would be used by the public mainly for walking exercise, from which they would benefit at the same time as they were enjoying the fresh air. (p. 3)

His comments echoed those made by Smith (1852) in the first published book on parks:

> The pale mechanic and the exhausted factory operative might inhale the freshening breeze and some portion of recovered health; the busy shopkeeper and the more speculative merchant might enjoy relaxation and bracing exercise in temporary seclusion from their toils and cares; and the family troop, the children with their nurses, or the sportive juveniles in the company of their staid seniors might take their walk or spend their play-time apart from the bustle of the streets, and secure from the accidents to which, in crowded thoroughfares, they are necessarily exposed. (p. 156)

The communitywide dimension of parks as lungs

Since the communitywide dimension of the metaphor was more frequently cited both by the medical community and in newspapers and magazines, it suggests it was more potent than the private dimension in coalescing support for urban parks.

The belief that parks were an antidote to miasmas was prominent from the beginning of the nineteenth century. For example, in 1803 John Claudius Loudon claimed that London's squares were "of greatest consequence to the health of its inhabitants" because they promoted "the free circulation of air" (Loudon, 1803, p. 739). This belief emanated from Joseph Priestley's 1771 discovery of oxygen and nature's role in producing it. When he put a mouse in a sealed box with a burning candle, the candle went out and the mouse died due to a lack of air. However, he found that putting a green plant in that jar and exposing it to sunlight "refreshed" the air, so the flame continued to burn and the mouse to breathe. In his own words, Priestley reported that on 17 August 1771 he "put a [living] sprig of mint into air in which a wax candle had burned oil and found that, on the 27th of the same month, another candle could be burned in the same air". The "restorative which nature employs for this purpose", he stated was "vegetation". When he was presented with a medal for his discovery, the citation read in part: "For these discoveries we are assured that no vegetable grows in vain … but cleanses and purifies the atmosphere" (Raven, Evert, & Eichorn, 2005, p. 116).

A system of "lungs" spread throughout a city was seen as a means of halting the spread of disease by providing residents with access to clean air. Cleansing of the air was done by vegetation, but in the dense industrial cities this was primarily confined to parks. The perceived role of parks in cleaning air led to provision for them being included in the UK's

1848 Public Health Act, even though their contribution was relatively small when compared to most of the other sanitation improvements that the Act authorized. Its inclusion suggests the linkage between parks and health was widely accepted as conventional wisdom, and was conceptually and intuitively obvious. Fresh air was perceived to be nature's way of countering the pervasive dangerous effluvia.

Amidst the filth, smoke and nauseating odours, parks were perceived to be analogous to a pulmonary organ or respirator providing a source of ventilation to help purify the city. Like lungs, parks brought in fresh healthful air and expelled tainted, dangerous gases. One historian who used the metaphor to explain parks' relationship to sanitary reform suggested that while parks were the lungs of the city, water and wastewater sanitary services were the city's circulatory systems (Melasi, 2000, p. 1)

Genesis and diffusion of the metaphor

In 1808 William Windham opposed a proposal in Parliament to allow the crown to build eight houses in Hyde Park. He noted, "It was a saying of Lord Chatham [formerly William Pitt the Elder who was Prime Minister from 1757 to 1761 and again from 1766 to 1768] that the parks were the lungs of London". This appears to be the first time the metaphor was used in public debate. Windham was appalled at this housing proposal: "No means could be more effectual for the destruction of these lungs than the proposed plan". His fierce opposition was a key factor in the plan being defeated (Hansard, 1808, cc 1124).

The lungs metaphor was subsequently invoked by the Earl of Mansfield in 1830 in a House of Lords debate in which he successfully opposed a proposal to enclose Hampstead Heath and remove it from the public domain (Examiner, 1830, p. 24). Other references to parks as lungs appeared later in that decade in *The Mirror of Literature, Amusement, and Instruction* (1833, 1839).

In 1839 a lengthy article in *Blackwood's Magazine* chastised the London Commissioners for their failure to create public parks in the city, charging that as soon as "pestilence completes its ravages … we are too happy to dismiss it from our thoughts and to forget all enquiries as to the means of prevention for the future" (Murray, 1839, p. 212). The author noted that in great cities there is "an under-current of pestilence at all times", and that "bad drainage, bad air, bad water, and bad smells, perpetuate the epidemics they originate" (p. 212). He went on to observe: "every city has its public pulmonary organs – its instruments of popular respiration – as essential to the mass of the citizens as is to individuals the air they breathe" (p. 213). He supported this contention by citing parks in many other European cities, including Paris, Madrid, Rome, Naples and Vienna, and concluded:

> The mighty modern Babylon [London] pours her pent-up population through the various avenues of her Parks. Well, indeed, and happily, have these been designated "THE LUNGS OF LONDON" … The Lungs of London, then, consist of great divisions or lobes, embracing the west end of the town and extending round to the northward … Regent's Park is the northern lobe of the Lungs of London. (p. 214)

However, he notes that all the parks were owned by the monarchy and that the poorer "eastern side of the city is lamentably destitute of breathing-spaces for the pent-up citizen" (p. 214). He concludes: "We do not in the least doubt, that the mortality of the

metropolis is exactly in the inverse ratio of proximity and access to public parks and open space" (p. 227).

The Mirror of Literature, Amusement, and Instruction again voiced its support for new parks in London in 1841 arguing that "for a supply of fresh air, what we require is that in every district the inhabitants should be within half a mile of some large open space" (p. 43). The author recognized their value as places where people could play, relax and exercise, but their primary value was to

> serve as a kind of reservoirs of pure air for the adjacent districts, as well as for spaces into which foul atmospheres of the neighboring streets are speedily diluted, and at length completely removed … it is probable that but for these open spaces [in the "most opulent and luxurious" areas of London] pestilence would almost constantly rage in every part.

The author was critical of them not being more freely open to the general public, but even when closed they "serve as reservoirs of pure air" (p. 44).

In March 1842 *Blackwood's Magazine* elaborated on the metaphor:

> Fresh air is luxury to the Londoner. He drinks it up, when he can get it, as a coalwhipper inbibes strong beer. The air of the densely-populated parts of London – and what part of London is not densely populated? – surcharged with smoke and dust, and vomited forth once and again from a million and a half pairs of human bellows, becomes substantial vapour, gross and unpalpable. Sometimes you can smell it, oftener you taste it, and at intervals you may cut it with a knife. When you get into the Parks, clear of the dusty-town, your lungs at once inform you of the obligation you have conferred upon them by changing their diet; your muscular fibre, braced by the current of pure air, becomes enbued with unwonted activity; your brain is exhilarated, and a pleasing intoxication stimulates every nerve. (pp. 380–381)

By the 1840s, "the lungs of London" had diffused to other cities. Thus, the editor of the *Manchester Times* in 1844 exhorted his readers to support the nascent campaign for public parks in that city:

> The parks have been well named the "lungs of London." They have saved thousands of lives, and sweetened the lot of and poetised the existence of all dwellers in Cockaigne. Dusty, smoky, toiling Manchester has no lungs! The rich and influential are asked to extend the boom of breathing fresh air, uncharged with dust and smoke. (Ruff, 2000, p. 12)

Thus, in 1844 when Mark Philips, Member of Parliament for Manchester, addressed a large meeting at the city's Town Hall convened to launch a campaign to raise private subscription funds for parks he stated:

> We must first secure great open spaces, to give, as it were lungs to the inhabitants of densely-populated districts – reservoirs of fresh air, where the people can not only recreate themselves, but the spaces themselves, containing so large an area, must naturally assist in a very material degree in the ventilation and purification of the town itself. (Kay, 1844, p. 15)

At a follow up meeting which Philips addressed, held a month later at Manchester's Free Trade Hall, a resolution was adopted that compared the human body with the new industrial machines:

> A machine needed oiling and looking after if it was to work well and not break down before its time, and as oil was to machinery, so pure air was to the human frame, it prevents the friction and corrosion of parts, removes impurities from the blood … Bad air fills the body

> with the impurities, and impedes its proper action; just as bad oil clogs and hinders the progress of machinery. (Cited in Conway, 1985, p. 235)

One of the vehicles formed to build public support and bring the parks in Manchester to fruition was a "Working Classes" committee. Its secretary and chairman later in 1844 in an address to their constituents reinforced this theme: "Mortality is greatest where the atmosphere is worst. More than two persons out of every hundred die in the township of Manchester, for one in Broughton [a nearby rural community]. THIS IS A STARTLING TRUTH!" So "Working Men will ask, what means can be adopted [to reduce this] since it is impossible for the masses to enjoy a country life?" The answer offered was:

> The air that has passed through our lungs and is no longer fit for respiration, which if breathed over and over again produces disease and death, is now useful in the vegetable world, capable of contributing to its development and providing food for man … What we need to preserve the health of the town is, a greater amount of vegetation, open spaces for ventilation, for active recreation and exercise, so as to oblige us to breathe the greatest possible amount of oxygen to purify the blood. The establishment of public parks will accomplish all this; will give the means for exercise and enjoyment, the means for health, both for animal and vegetable nature. (Ruff, 2000, p. 15)

Smith (1852) in his pioneering book aided dissemination of the lungs metaphor:

> Public parks, and even the smaller gardens on squares and streets, are fitted … to rarefy the thick black clouds of smoke which rise from the cities … and to provide a larger supply of salubrious air for all the inhabitants. In short, they are, as it were, the lungs of cities and towns; and as such they are breathing places to thousands. (p. 157)

The effectiveness of parks as lungs offering protection against miasmas that was suggested by Priestley's experiments was alluring, but it was quickly apparent that the sheer volume of pollution overwhelmed the capacity of parks to cleanse the air. Small parks were especially ill-equipped to perform this role. Liverpool and Manchester, which were in the vanguard of park provision in the UK, offered evidence relating to the ineffectiveness of small parks. Thus, the Select Committee on Public Walks (1833) was informed that the 4 acre St James Park, which was Liverpool's only park at that time

> Is now little frequented in consequence of its being surrounded by the town, and the trees being spoiled by the smoke of the town … persons prefer to go a great distance [to the edge of the town] rather than walk in that park. (p. 41)

Three decades after the 1833 Select Committee report were to pass before Liverpool acted to provide the city with "lungs". The Council's Improvement Committee argued for a ring of parks around the city in 1850, but only Wavetree Park was opened in 1856. In 1859, the Committee again argued for a ring of parks to be developed around the city which would act as, "a sanitary cordon, an immense health duct, along a line already peopled to a great extent" (Improvement Committee, 1859, p. 9). This resulted in Shiel, Newsham, Stanley and Sefton Parks being built in the 1860s. In Liverpool there was a clear link between the pressures to provide urban parks and concerns about disease: "The embarrassment provided by the wide publicity of disease in Liverpool provided a stimulus to their [parks] consequent development" (Marne, 2001, p. 429).

Queens Park and Philips Park in Manchester were both located about one mile from the city centre. They were funded from voluntary subscriptions and opened in 1846. After the

initial euphoria associated with their construction, there was recognition that the vision of them as oases of clean air was a mirage, since their relatively small size (27 and 30 acres, respectively) rendered them ineffective as "lungs". Further, both suffered from industrial pollution which killed the vegetation, so their oxygenation potential was nullified. In 1872 it was noted:

> The atmosphere was perfectly clouded by it, and the smell of smoke was stifling. It is quite impossible that healthy vegetation can subsist with such atmospheric conditions, and the trees in the higher portion of the park were severely suffering. (Ruff, 2000, p. 87)

Indeed, in that year a series of scientific analyses of sulphur compounds and acids in rain around Manchester led to a report in which the term "acid rain" was coined for the first time, and described the damage it caused to plants and materials (Ruff, 2000). Thus, in Philips Park by 1881, the leafy picturesqueness was replaced by stunted, sickly trees with shrubs, and no tall trees remained. By that time, the city's Parks Committee had given up on the idea of parks as vibrant lungs and could see no way forward:

> In a climate like Manchester's where the sun is for the most part obscured by rain and smoke clouds, and where, even when these Chemical rays which are the source of vegetable life do penetrate, they are compelled to struggle through an atmospheric charged, and unavoidably so, with large impurities, thus suffering, in the course of their passage, a serious diminution of their original vivifying power and where every object is thickly coated with solid matters constantly showering from the atmosphere, the culture of trees and plants generally cannot fail to be a difficult problem. (Ruff, 2000, p. 87)

Larger parks may have been better equipped to fend off the feared miasmatic smells, but the pervasive smoke and its accompanying soot particles had a relatively long reach. Thus, the gardeners in Regent's Park claimed they could tell how many days sheep had been pastured there by the blackness of their wool (Wohl, 1983). The conceptual vision of parks as lungs was sound, but the reality was that Priestley's experiments did not have to contend with the intervening variable of pollution.

Transition of the metaphor to the US

The need for "lungs" in US cities was even more acute than in the UK, because in the UK royal parks and private estates of the nobility and upper classes which had been outside of towns, increasingly were embraced by expanding town boundaries and de facto became "lungs". Further, these properties gradually were yielding to societal pressures that caused them to become more accessible for public use (Olmsted & Kimball, 1970). No comparable urban private park spaces were available in US cities.

The first in-depth study of sanitary health problems in the US was authored by Dr John H. Griscom who was the city's health inspector. Griscom espoused miasmatic theory:

> Summer is the season generally deemed most prolific in diseases; the cause usually assigned for this is the heat of the weather acting upon animal and vegetable matter, producing more extensive and rapid decomposition, the gases from which are generally imagined to be so destructive to life and health. (p. 3)

And he made the case for clean air that parks provided:

> Atmospheric air is to the animal system, a powerful stimulant as well as nutrient substance. In sufficient purity and copiousness, it imparts a sustaining and vivifying power unequalled by any other substance … Air, when pure, gives a freshness and vigor, a tone to the nervous and muscular parts of the system, productive of the *highest degree* of mental and physical enjoyment. (Griscom, 1845, p. 49)

In 1859, *Scientific American* observed, in the context of New York City, that "Hitherto our public parks have been so small as to excite the derision of foreigners" (p. 337). The author went on to note: "In all the cities in Europe, there are large public parks which form huge lungs for the pent-up streets … As a means of promoting the public health, they have been considered invaluable and indispensible" (p. 337).

When Olmsted arrived on the parks stage in the early 1850s, he was familiar with miasmatic theory and the sanitation debate from his recent walking tour in England (1852). His belief in it was consistently reinforced throughout his career. For example, He affirmed it in his correspondence with John Rauch (Szczygiel & Hewitt, 2000), a Chicago physician who became President of the American Public Health Association; was a staunch proponent of miasmatic theory; and was highly influential in launching parks in Chicago (Rauch, 1869).

In his position as Secretary of the US Sanitation Commission in the Civil War, Olmsted hired many physicians (including John Griscom), who further reinforced his conviction of the linkage between miasmas and disease. His work in that position illustrated his conviction that the quality of the physical and natural environment had profound influence on the health. Charged with improving the health of Union troops in their camps, he focused on physical planning issues, such as the location of camp sites; the provision of drainage and waste disposal; the ventilation of tents; and the storage and preparation of food (Fisher, 2010).

Olmsted was unequivocal in his conviction: "Modern science has beyond all question determined many of the causes of the special evils by which men are afflicted in towns". Primary among these was air that "carries in to the lungs highly corrupt and irritating matters, the action of which tends strongly to vitiate all our sources of vigor" (Olmsted, 1870, p. 179). He spoke of "the two great natural agents of disinfection, sunshine, and fall foliage" (p. 183) and explained how parks and tree-lined boulevards performed their cleansing role:

> Air is disinfected by sunlight and foliage. Foliage also acts mechanically to purify the air by screening it. Opportunity and inducement to escape at frequent intervals from the confined and vitiated air of the commercial quarter, and to supply the lungs with air screened and purified by trees and recently acted upon by sunlight … if these could be supplied economically, our problem [ill-health] would be solved. (Olmsted, 1870, pp. 182–183)

One of the primary justifications Olmsted used to convince cities to invest in parks was that they were "outlets for foul air and inlets for pure air". This theme was pervasive in his writings and was exemplified by his use of the "lungs of the city" metaphor, often accompanied by synonyms such as "ventilating places", "breathing-holes", and "airing grounds" (Olmsted, 1886, p. 467).

Olmsted's extraordinary effectiveness in facilitating the expansion of urban parks in the US was a function not only of his extensive writings and speeches, but also of his alignment with the prevailing conventional wisdom of the day relating to miasmas:

> He spoke a language of landscape and health that provided a foundation for discussion in each urban community in which he was employed. His clients were concerned and active citizens; both parties mutually supported the perspective of an essential environment connection to health. (Szczygiel & Hewitt, 2000, p. 733)

This influence led to widespread use of the lungs metaphor or its synonyms by park advocates. For example, Fryer (1879) in New York City declared: "Parks are the lungs of the city, and through them come life and strength and growth" (p. 6). He proposed a new city park in the dense tenement area of eastern Manhattan because, "The bills of mortality prove that disease is ever rampant in these terrible neighborhoods". He suggested the whole city would benefit since "Pestilence knows no boundaries and is no respecter of persons" (p. 3).

The extensive land acquisitions that formed the basis for the renowned Minneapolis park system were acquired in the 1880s. Although other values of parks were articulated in the extended debate, the lungs rationale dominated (Crompton, 2013).

Similarly, in his address at the inauguration of Baltimore's first large park, Druid Hill Park, the city's mayor stated, "It is only by the occurrence of modern epidemics, producing that attention to sanitary matters … that the necessity for good Parks has been duly recognized, and the insufficiency of those already existing properly felt" (Swan, 1860, p. 21).

Is the metaphor still relevant?

In contemporary times, park managers and advocates are increasingly challenged to convince elected officials to allocate adequate funding resources to maintain and renovate urban parks. Many policy-makers regard parks as being relatively discretionary, non-essential services that are nice to have if they can be afforded after more important services have been funded. It has been suggested that the key to viable funding is to reposition parks "so they are perceived to contribute to alleviating problems that constitute the prevailing political concerns of policy makers who are responsible for allocating tax funds" (Crompton, 2007a, p. 75).

A metaphor can be a valuable tool for raising awareness. The lungs metaphor was effective in the nineteenth century because it aligned parks with the prevailing political and social concerns of that era. In contemporary terms, the alignment would be termed "positioning". The concept of positioning entered the marketing lexicon in the 1970s and its originators offered the following counsel:

> Working out an identity program [position] for a corporation usually entails a retracing of steps until you discover the basic business of a company. This requires poring over old plans and programs, seeing what worked and what didn't. (Ries & Trout, 2001, p. 203)

The "retracing of steps" undertaken in this paper demonstrated the metaphor "worked". It effectively communicated the believed contributions of parks to ameliorating public health problems, and it resonated with decision-makers.

At the end of the nineteenth century, efforts to improve public health were redirected away from rectifying negative physical and natural environmental influences, towards epidemiological and medical solutions (Fisher, 2010). This redirection prevailed for most of the twentieth century. However, in the past two decades there has been a resurrection of interest in the determinant effect of environmental influences on health. The US Surgeon

General's report, *Physical activity and health*, may be viewed as a primary catalyst for this reawakening (U.S. Department of Health and Human Services, 1996).

The "parks-as-lungs" metaphor's ubiquitous contemporary presence noted in the introduction suggests it remains poignant and that it is useful in positioning parks as ameliorators of some of a community's most pressing problems. Its contemporary use could embrace four contributions of parks to public health: (i) Encouragement to exercise to reduce obesity; (ii) reduced psychological stress; (iii) alleviation of air pollution and (iv) amelioration of the "heat island" effect (Crompton 2007a).

The metaphor meets a primary criterion for effective positioning: "It should be expressed in a single line or slogan" (Crompton, 2009, p. 90). It is unlikely that all four of these contributions will be equally effective in a given community as "selling ideas for motivating residents and elected officials to allocate resources to leisure services" (p 92). However, the metaphor is sufficiently malleable to accommodate whichever one or two of them resonates most strongly in a specific context.

Health authorities concerned with the high costs associated with obesity that are borne by government exhort people to exercise. The original intuitively appealing conceptual nexus between parks and exercise that supported the private good dimension of the lungs metaphor remains strong even though it may lack some of its original potency because people can now exercise conveniently using sidewalks and trails in multiple urban locations that were not available in the nineteenth century.

A body of empirical research in the last decade has confirmed that urban parks can contribute to alleviating obesity. For example, a 10 year longitudinal study of 3000 children in California reported that those who lived closer to park and recreation facilities were more active and had a much lower body mass index than those who lived further away (Wolch et al., 2010). The authors of a review of scientific evidence concluded, "proximity to parks was generally associated with increased physical activity" (Kaczynski & Henderson, 2007, p. 315). They cautioned this was a tentative conclusion because of the limited number of studies. However, a later review was unequivocal in concluding, "The number of parks and playgrounds in a community and the physical area devoted to them are positively related to the physical activity levels" (Godbey & Mowen, 2010, p. 5).

A second connotation of the lungs metaphor is that it can embrace the role of parks and park-like settings in reducing stress. Environmental stress is a condition experienced daily by many who live or commute in urban or blighted areas. The stress may involve both psychological emotions, such as frustration, anger, fear and coping responses and associated physiological responses that use energy and contribute to fatigue. Its detrimental impact to health and well-being may be manifested in characteristics such as headaches, tension, short temper, aggressive temper, low morale and increase in number of sick days away from work (Kuo, 2010).

In 1865, Olmsted wrote insightfully about stresses associated with cities and job demands and argued that viewing nature was effective in inducing recovery from such stresses. He asserted that such an environment, "employs the mind without fatigue and yet exercises it; tranquilizes it and yet enlivens it; and thus, through the influence of the mind over the body, gives the effect of refreshing rest and reinvigoration to the whole system" (Olmstead, 1865, p. 21). Olmstead's strong belief that natural landscapes had a restorative effect bringing "tranquility and rest to the mind" formed an important part of his influential justification for providing parks in American cities.

Olmsted's views on their role in reducing stress were based on personal observation and intuition, rather than science. In the past two decades, this intuition has been subjected to rigorous empirical research. A review of this body of findings was unequivocal:

> The benefits of nature that have been intuited and written about through the ages have withstood rigorous scientific scrutiny. Yes, we still find these benefits when we measure them objectively; yes, we still find these benefits when non-nature lovers are included in our studies; and yes, we still find these benefits even when income and other factors that could explain a nature-health link are taken into account. In the face of the tremendously diverse and rigorous tests to which the nature-human health hypothesis has been subjected, the strength, consistency, and convergence of the findings are remarkable. Rarely do the scientific findings of one question align so clearly. (Kuo, 2010, p. 4)

Parks may aptly be described as "still eyes in the hurricane" of the city; as safety valves for the release of the tensions of modern life; and as the city's lungs, which enable people to breathe in relaxation and escape pressure.

While the role of parks in cleaning the air as an antidote to miasmas lost its relevance when germ theory emerged towards the end of the nineteenth century, their cleansing capacity remains as a supportive contemporary rationale in some contexts. Periodically, conditions coalesce to create highly visible toxic air pollution which, like the sights of filth and smells of miasmas, gives warning to the senses that health is endangered. It appears to be especially prominent in emerging industrial nations such as India and China where overcrowding, filth and squalor, poor sanitation and severe air pollution bear resemblance to conditions in the nineteenth century UK and US cities which spawned the metaphor.

The parks as lungs metaphor resonates with some because there is a clear conceptual linkage between the cleansing capacity of parks and alleviating air pollution. The linkage appeals to simple logic and "common sense" and is aligned with a prominent societal concern. However, there are two major differences that dilute its potency when compared to the urban environments that nurtured it.

First, the carbon dioxide, particulate pollutants, ozone and other gaseous pollutants, and toxic chemicals such as nitrogen dioxide, sulphur dioxide, formaldehyde, benzene and hydrogen fluoride that characterize contemporary air problems, frequently are present in lower levels that are not obvious even though they are damaging to health (GASP, 1999). In these contexts, the lack of visibility of the pollution makes the metaphor more difficult to "sell" to the general public.

A second diluting change is that parks are no longer the only oases of vegetation. On average, parks comprise about 6% of city land. However, in total, vacant and open-space public lands, which may contain parklands, comprise 24% of city area (Nowak & Heisler, 2010). These public areas are now supplemented by private gardens, roof gardens, street trees and other sources of vegetative landscaping. Many cities have moved closer to Leopold's (1939) concept of "biota as a whole" in contemporary land use planning, rather than focusing on discrete parks dispensed throughout the community (Solnit, 2013). Thus, "parks as lungs" perhaps should be reformulated as "vegetation as lungs" to more accurately reconcile Priestley's original findings with contemporary conditions. This shift would recognize that the effectiveness of vegetation in cleansing air is a function of aggregated efforts at regional, national and local levels, which contrasts with the perceived more

localized proximate impact that stimulated support for parks to combat miasmas in the nineteenth century.

A fourth contemporary dimension of the lungs metaphor relates to the "heat island effect". It was recognized in the nineteenth century by Dr Edward Barton, who was chief medical officer for New Orleans and was outspoken in his support for the need for "lungs" in his city. Writing in 1849 he observed:

> The influence of luxuriant foliage and abundant shade in the public squares and streets of large cities, and particularly southern ones, is susceptible to very easy explanation: they absorb deleterious gases, and receive or prevent that reflected heat from brick houses, which is so oppressive to those who cannot otherwise escape their influence. (American Medical Association, 1849, p. 593)

Barton's reference to the influence of vegetation on alleviating heat in the city resonates today. The term "heat island" recognizes that cities are islands of warmer temperatures in a sea of rural cooler temperatures. An early review of empirical findings concluded: "Large parks or residential neighborhoods with extensive vegetation can produce air temperature reductions as great as 10°F compared to nearby areas with little vegetation" (McPherson & Simpson, 1995, p. 112). A later review of findings reporting the heat island effect increased the typical impact concluding: "Maximum intensities increase with city size and may commonly reach 18°F(10°C) for the largest cities" (Nowak & Heisler, 2010, p. 12).

Parks with a large portion of their area in vegetation, especially trees, will reduce the heat not only in the park, but in the area surrounding the park, sometimes for a distance as great as the park's diameter. Hence, a substantial system of parks leads to a reduction in urban heat and a concomitant reduction in lives lost during heat waves and in costs for air conditioning. It has been concluded, "Although the overall economic effect is not fully known, it is likely on the order of billions of dollars annually at the national scale" (Nowak & Heisler, 2010, p. 4). Extending the lungs metaphor to embrace the air cooling effect of parks is taking narrative license since this occurs through transpiration – the evaporation of water through the leaves of vegetation. However, its use in this context in the nineteenth century provides precedent.

As well as pithily and vividly positioning parks by capturing the beneficial outcomes they provide to individuals and society, utility of the lungs metaphor extends to chronology. The genesis of this dimension of the metaphor was an article in the *Spectator* (1844) featuring the new subscription parks that emerged in Manchester. The author argued that parks should be developed on the edge of towns in advance of inevitable expansion of the population into those areas:

> Public parks have been called the lungs of the towns. In the animal kingdom the lungs are among the earliest developments, and are at first disproportionately large, the other parts of the system expanding in bulk at a later period. (Spectator, 1844, p. 878)

The observation that lungs are among the earliest features to develop in an embryo is consistent with the widespread practice in the formative years of parks of building them ahead of development as part of a city's infrastructure package to stimulate development around them (Crompton, 2007b).

A comprehensive vision of the chronology dimension was articulated and popularized by Howard (1902). His Garden Cities movement was manifested at Letchworth and Welwyn in

the UK and transitioned to the US when Olmsted (Junior) designed Forest Hills Garden City. Later in the twentieth century the approach was prominent in the UK's New Towns movement. Further confirmation of this role is illustrated by the many private subdivisions that create park, trail, golf course and other recreation amenities at the outset in order both to enhance the value of lots and to expedite their sale. In recent decades, numerous cities which have engaged in regeneration have realized that parks have a primary role in anchoring and revitalizing a deteriorated area. Hence, the metaphor's connotation of parks chronologically preceding development remains salient.

The potency of linking parks with the human physiological system through the lungs metaphor was reinforced by its endorsement by prominent members of the medical community. The role of parks in sanitation reform was relatively peripheral, not central, but their positive contribution to alleviating the problem was recognized by the medical profession. In the UK, Dr Thomas Southwood Smith, the country's leading medical authority; Dr Neil Arnott in London; Dr William H. Duncan, Liverpool's medical officer; Dr James P. Kay, medical officer for Manchester and others, were highly visible in legislative advocacy for improved sanitation in their cities and included parks as part of their solution to the disease problem. In the US Drs John Griscom in New York City, John Rauch in Chicago, Edward Barton in New Orleans, and Oliver Wendell Holmes (Senior) in Boston were similarly prominent advocates for parks.

In contemporary society, the medical community consistently points out the virtues of exercise and the hazards of air pollution. The Surgeon General's periodic reports are perhaps the most visible of these efforts (e.g. U.S. Department of Health and Human Services, 2015). There are examples of physicians issuing "parks prescriptions", and of insurers and health plans sponsoring trails, exercise events and parks, and encouraging their subscribers to use them. However, for the most part, unlike their nineteenth century predecessors, they have not been prominent in legislative advocacy for parks funding. Their lack of high profile involvement deprives the metaphor of the aura of authority with which it was originally endowed through the medical community's active engagement.

Health care professionals – nurses, pharmacists and physicians – are consistently identified as being among the people most trusted by the general public (Saad, 2010). If they were to widely embrace the lungs metaphor and publicly articulate the role of parks in health care, then their widely acknowledged professional credibility, believability and trust, and their social standing in communities would confer substantive credibility to its argument. A stronger association with physicians would create a conceptual bridge for stakeholders and greatly strengthen their perceptions of the lungs metaphor and the nexus between parks and health care.

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References

American Medical Association. (1849). First report of the committee on public hygiene of the American medical association. *The Transactions of the American Medical Association*, *2*, 425–642.

Arnott, N. (1833). *Elements of physics, natural philosophy: general and medical* (5th ed.). London: Longman & Roberts.
Birch, E. L., & Cipolla, V. (2013, November 2). A shadow on the 'lungs' of New York. *New York Times*.
Bisoee, A. (2013). City's new green lung: Jusco develops abandoned Kadma plat into park. *The Telegraph* (Calcutta, India). Retrieved from http://www.telegraphindia.com/1130615/jsp/jharkhand/story_17007
Blackwood's Magazine. (1842). *The world of London part X: The parks and gardens*, pp. 380–384.
Cartwright, F. F. (1977). *A social history of medicine*. London: Longman.
Conway, H. (1985). The Manchester/Salford parks: Their design and development. *Journal of Garden History*, *5*(3), 221–260.
Corburn, J. (2009). *Toward the healthy city: People, places and the politics of urban planning*. Cambridge: MIT Press.
Crompton, J. L. (2007a). *Community benefits and repositioning: The keys to park and recreation's future viability*. Ashburn, VA: National Recreation and Park Association.
Crompton, J. L. (2007b). The role of the proximate principle in the emergence of urban parks in the United Kingdom and in the United States. *Leisure Studies*, *26*(2), 213–234.
Crompton, J. L. (2009). Strategies for implementing repositioning of leisure services. *Managing Leisure*, *14*, 87–111.
Crompton, J. L. (2013). The health rationale for urban parks in the nineteenth century in the USA. *World Leisure Journal*, *55*(4), 333–346.
Davison, G. (1983). The city as a natural system: Theories of urban society in early-nineteenth century Britain. In D. Fraser & A. Sutcliffe (Eds.), *The pursuit of urban history* (pp. 349–370). London: Edward Arnold.
Examiner (1830, May 9) London: House of Lords. 1162, p. 294.
Fisher, T. (2010). Frederick Law Olmsted and the campaign for public health. *Places*, *November*, 1–6.
Friends of City Park. (2012). *City Park: The heart and lungs of the Kenyan capital Nairobi*. Retrieved from http://walkingtrailskenya.com/trails/city-park/
Fryer, W. J. (1879). *A proposed new city park for the extreme eastern portion of New York*. New York Public Library, Humanities-Histroy & Gen, IRH p.v.6, no. 3.
Galveston-Houston Association for Smog Prevention (GASP). (1999). *Trees and our air*. Houston, TX: GHASP.
Godbey, G., & Mowen, A. (2010). *The benefits of physical activity provided by park and recreation services: The scientific evidence*. Ashburn, VA: National Recreation and Park Association.
Great Britain Poor Law Commissioners. (1842). Report to her majesty's principal secretary of state for the home department on an inquiry into the sanitary condition of the laboring population of Great Britain. London: W. Clowes.
Griscom, J. H. (1845). *The sanitary conditions of the laboring population of New York City*. New York, NY: Harper & Brothers.
Hansard. (1808, June 30). *Hyde park*, 11, c 1124.
Hansard. (1833, February 21). *Public health*, 15, cc 1849–1859.
Health of towns select committee report of 1840 (1968). New York, NY: Augustus M. Kelley.
Howard, E. (1902). *Garden cities of tomorrow*. Reprinted 1946. London: Faber and Faber.
Improvement committee, Liverpool town council (1859, April 27). Minutes.
Johannesburg City Parks. (2013). *Out parks*. Retrieved from http://www.jhbcityparks.com/index.php/out-parks-contents-28
Joyce, P. (2003). *The rule of freedom: Liberalism and the modern city*. New York, NY: Verso.
Kaczynski, A. T., & Henderson, K. A. (2007). Environmental correlates of physical activity: A review of evidence about parks and recreation. *Leisure Sciences*, *29*(4), 315–354.
Kay, A. (1844, August). *Report of public meeting at Manchester town hall*. Manchester Public Library.
Kuo, F. F. (2010). *Parks and other green environments: Essential components of a healthy human habitat*. Ashburn, VA: National Recreation and Park Association.

Leopold, A. (1939). A biotic view of land. In S. L. Flader & J. B. Callicott (Eds.), *The river of the mother of god and other essays* (pp. 266–273). Madison: University of Wisconsin Press.
Loudon, J. C. (1803). Letter to the editor. *Literary Journal*, *2*(12), 739–742.
Marne, P. (2001). Whose public space was it anyway? Class, gender and ethnicity in the creation of Sefton and Stanley Parks, Liverpool: 1858–1872. *Social and Cultural Geography*, *2*(4), 421–443.
McPherson, E. G. & Simpson, J. R. (1995, March/April 12–17). *Shade trees as a demand-side resource*. Home energy.
Melasi, M. V. (2000). *The sanitary city: Urban infrastructure in American from colonial times to the present*. Baltimore, MD: Johns Hopkins University Press.
Mirror of Literature, Amusement, and Instruction. (1833). *The sketch book: An American* 30: 867 p. 381.
Mirror of Literature, Amusement, and Instruction. (1839). *The River Thames*, 33: 951, p. 351.
Mirror of Literature, Amusement, and Instruction. (1841, July 17). *The new London parks*. 38: 1068, 42–44.
Murray, J. F. (1839). *Blackwood's Magazine*. The lungs of London. 46, 212–227.
Nowak, D. J., & Heisler, G. W. (2010). *Air quality effects of urban trees and parks*. Ashburn, VA: National Recreation and Park Association.
Olmstead, F. L. (1865). *The value and care of parks*. Report to the congress of the State of California. Reprinted in Landscape Architecture 17:20–23, 1952.
Olmsted, F. L. (1852). *Walks and talks of an American farmer in England*. Columbus, OH: Joseph H. Riley.
Olmsted, F. L. (1870). Public parks and the enlargement of towns. In C. E. Beveridge, C. F. Hoffman, & K. Hawkins (Eds.), *The papers of Frederick Law Olmsted. Supplementary series 1. Writing on public parks, parkways and park systems* (pp. 171–205). Baltimore, MD: Johns Hopkins University Press.
Olmsted, F. L. (1886). Notes on the plan of Franklin Park and related matters. In C. E. Beveridge, C. F. Hoffman, & K. Hawkins (Eds.), *The papers of Frederick Law Olmsted. Supplementary Series 1. Writings on public parks, parkways and park systems* (pp. 460–534). Baltimore, MD: Johns Hopkins University Press.
Olmsted, F. L. Jr., & Kimball, T. (1970). *Frederick Law Olmstead, landscape architect, 1822–1903*. New York, NY: Benjamin Blom.
Parliamentary Papers. (1846). Metropolitan sewage manure company committee, p. 651.
Pettigrew, W. W. (1937). *Municipal parks: Layout, management and administration*. London: The Journal of Park Administration.
Powell, M. (2013). Park deals chip away at city's gems. *New York Times*. Retrieved from http://www.nytimes.com/2013/04/30/nyregion/park-deals-chip-away
Rauch, J. H. (1869). *Public parks: Their effects upon the moral, physical, and sanitary conditions of the inhabitants of large cities with special reference to the city of Chicago*. Chicago, IL: S.C. Griggs & Co.
Raven, P. H., Evert, R. F., & Eichorn, S. E. (2005). *Biology of plants*. Basingstoke: N.H. Freeman.
Report from the parliamentary select committee on public walks. (1833, June 27). London: The House of Commons.
Ries, A., & Trout, J. (2001). *Positioning: The battle for your mind. Twentieth anniversary edition*. New York, NY: McGraw-Hill.
Rockower, P. (2009). *Keeping the lungs of the city clean*. University of Southern California Global Health. Retrieved from http://uscglobalhealth.blogspot.com/2009/12/keeping-lungs-of-city-c
Ruff, A. R. (2000). *The biography of Philips Park Manchester 1846–1996*. Manchester: University of Manchester, School of Planning and Landscape.
Saad, L. (2010). *Honest and ethics poll finds congress' image tarnished*. Princeton, NJ: Gallup.
Scheer, R. (2001). Parks as lungs: America's urban forests make environmental and economic sense. *E Magazine*, 2(6).
Scientific American. (1859, November 19). City public parks. 1:21, p. 37.
Smith, C. H. J. (1852). *Parks and pleasure grounds or practival notes on country residences, villas, public parks and gardens*. London: Reeve and Co.

Smith, P. J. (2006). *Greening the city: City of Manchester parks and recreation master plan update*. Retrieved from http://www.greeninfrastructure.net/
Solnit, R. (2000). *Wanderlust: A history of walking*. New York, NY: Viking, Penguin.
Solnit, R. (2013). *Parks in need of a new metaphor*. Planetizen. http://www.planetizen.com/node/60835 February 19
Southwood Smith, T. (1830). *Treatise on fever*. Philadelphia, PA: Caney and Lea.
Spectator. (1844, September 14). The Manchester parks, 17: 846, p. 878.
Swan, T. (1860). *Inauguration ceremonies and address of the Honorable Thomas Swan on the opening of Druid Hill Park*. Baltimore, MD: Bull & Turtle.
Szczygiel, B., & Hewitt, R. (2000). Nineteenth-century medical landscapes: John H Rauch, Frederick law Olmsted and the search for salubrity. *Bulletin of the History of Medicine*, *74*, 708–734.
U.S. Department of Health and Human Services. (1996). *Physical activity and health: A report of the Surgeon General*. Washington, DC: Author.
U.S. Department of Health and Human Services. (2015). *Step it up! The surgeon general's call to action to promote walking and walkable communities*. Washington, DC: Author.
Walker, R. A. (2009). *The lungs of the city: 75 years and counting for east bay park*. Retrieved from http://www.baynature.org/articles/the-lungs-of-the-city/
Wallace, A. D. (1994). *Walking, literature, and English culture*. Oxford: Clarendon Press.
Westminster Review. (1834). Article XV: Report from the select committee on public walks. *Westminster Review*, *20*, 496–514.
Wohl, A. S. (1983). *Endangered lives: Public health in Victorian Britain*. Cambridge, MA: Harvard University Press.
Wolch, J., Jerrett, M., Reynolds, K., McConnell, R., Chang, R., Dahmann, N., … Berthane, K. (2010). Childhood obesity and proximity to urban parks and recreational resources: A longitudinal cohort study. *Health and Place*, *16*(3), 137–157.
Yasin, A. (2008). *Rawalpindi: City's lungs in danger: vanishing green spaces, parks*. Retrieved from http://www.lahorerealestate.com/parkrealestatetimes/showthresd.php?