In spring 1848 James Newlands, ending his first year as Liverpool's municipal engineer, presented his first report to the health committee of the reformed borough council of Liverpool: a comprehensive agenda for the sanitary and social improvement of the town. Newlands and his report do not appear in the usual accounts of the revolution in public health, and his name is not prominent even in histories of Liverpool. Yet not only was Newlands (1813–71) Liverpool's first municipal engineer, but he was the first British municipal engineer in the modern sense.1 His post came into existence under the same Liverpool Sanitary Act of 1846 that established W. H. Duncan, his better known colleague, as Liverpool's first medical officer. And just as Duncan did much to define what a 'medical officer of health' did, so Newlands' Liverpool career would do much to define 'municipal engineering', a profession that was only beginning to develop at his death in 1871. Especially important is whether the municipal engineer would function mainly as a servant of a borough council, a high-level implementer of its policy, or alternatively as an independent maker of municipal policy, a diagnostician of the city's key problems, a goad prompting and guiding council action and forwarding reform under the guise of neutral expertise.2 Like

many later municipal engineers, Newlands did both: he was an able administrator; his success as an administrator lent credibility to his claim that certain environmental reforms—sewers, a sort of ‘green belt’ of boulevards, the demolition and replacement of substandard housing—were necessary, and gave him purchase as a kind of unofficial town planner a full half century before town planning was recognized. He was thus one of the first of those faceless municipal bureaucrats who practice politics by administration, influencing many aspects of life without ever being seen as persons with ideas.  

I shall not try to do full justice to Newlands here, but instead will focus on his conception of the scope of municipal engineering and its contribution to improved health, on his relation to the public health movement as it was being defined by Edwin Chadwick, and on what I can recover of the circumstances of his selection as Liverpool’s engineer. I can say little about his day-to-day activities in that post since, as is not the case with Duncan, the records of his management of his department appear not to have survived. I can also say far too little about his relations with Liverpool corporation, and can only raise some questions. Newlands served Liverpool during a period of pragmatic Tory dominance of its council, a period both of significant progress in the provision of public services—sewers, water, baths, parks, houses, trams—and of significant ratepayer opposition to those improvements. On many of these matters, cross-party collaborations, taking place within council committees or subcommittees, were exceedingly important in maintaining the public will to act. I would suggest that Newlands, whose job was to make public action both feasible and compelling, played a key role in the maintenance of such alliances. But because, as I make clear below, Newlands acted by drawing attention away from his actions, it will be difficult fully to understand the role he played.

The state institutions of public health in Britain were also significantly affected, I will suggest, by Newlands’ relations, during the late 1840s and early 1850s, with Edwin Chadwick and the new General Board of Health in London. During this period Chadwick was striving to convince the public that his

systematic approach to the sewering and watering of a city could work. Newlands, working independently in Liverpool on broadly Chadwickian principles, would have been the ideal source of a body of experience that would confirm the general feasibility of those approaches. But relations between the two were poor; Chadwick did not draw on Newlands’ experience, but instead treated Newlands as part of the opposition to his proposals. Newlands remained outside Chadwick’s orbit, choosing to cultivate the local political environment rather than embroil himself in national controversies. This is especially unfortunate, inasmuch as Liverpool, led by Newlands, Duncan, and their successors, would in many areas lead the way in urban and sanitary improvement. 4 As is well known, in 1854 Chadwick was ousted from power, and his lack of technical credibility—which Newlands might have provided—was a key factor. For the nation as a whole there followed a lapse in efforts for the systematic improvement of urban health, though there was no lack of piecemeal improvement. Although, as we shall see, matters of personality and professional rivalry contributed to the rift between Newlands and Chadwick, their poor relations were not wholly accidental, for even though the very concept of a ‘municipal engineer’ was to a considerable degree Chadwick’s, the two held incompatible understandings of what master such a person was to serve.

About Newlands we know relatively little. Son of an Edinburgh rope-maker, he attended Edinburgh High School and Edinburgh University and was then apprenticed to an architect, Thomas Brown, who served as architect to Edinburgh corporation. In the mid 1830s he was assisting David Low, the professor of agriculture at Edinburgh, designing exhibits of farm machinery, acquiring occasional practice as an architect of farm buildings, and continuing to study mechanics, mathematics, and chemistry. He was a minor contributor to the 1842 *Encyclopedia Britannica* (articles on the history of steam navigation and on rope-making). During the few years prior to his appointment in late January 1847 he was in Scotland as a consulting engineer cum architect, involved in valuing property to be taken for railway lines and in laying out farms.

Newlands, one of five candidates for the post of borough engineer, was elected and offered a remarkably high salary of £700 a year despite having little experience in matters of sewerage, drainage, street paving, or other of the duties of municipal engineers.\(^5\) One of his rivals was Robert Rawlinson, who would become well known as the chief of the Local Government Board's engineering inspectors during the 1870s and 1880s. Rawlinson too was young and inexperienced; the small number of candidates and the choice of an inexperienced outsider probably reflected the fact that in these years of railway boom most engineers were involved in that more lucrative work. Newlands was Liverpool's engineer for the remainder of his career with the exception of a period in the Crimea, working with Florence Nightingale (and Rawlinson) on the sanitary problems there. In addition to engineering Newlands was an accomplished flautist and painter; he exhibited at the Royal Scottish Academy. He married in 1845, his wife dying in 1848. Newlands himself was small and prone to bronchitis. In ill health, he retired early in 1871 and died in July. Aside from various reports to Liverpool's public health committee, his chief publication was *The Carpenter's and Joiner's Assistant* (1857 and later editions).\(^6\)

To make sense of the post Newlands took at the beginning of 1847 it is necessary to consider the discussions of health and environment in Liverpool that had taken place in previous years. The engineer's post united two debates that had hitherto largely been separate. The first concerned Liverpool's communal self-image and the social and civic duties of its citizens. The town was home to a transient middle class, bound to Liverpool only in the hope of making a quick fortune, to a

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5 According to White, Newlands was 32 when hired. If so evidently the birthdate given in his Institution of Civil Engineers obituary is incorrect (White, *Corporation of Liverpool*, p. 96).

6 Memoir in *Minutes of Proceedings of Institution of Civil Engineers*, XXXIII (1871–2), pp. 227–231. I have been unable to secure a copy of Newlands' other chief publication, *Liverpool Past & Present in Relation to Sanitary Operations* (Liverpool, 1859), a paper presented at the Liverpool Congress of the National Association for the Promotion of Social Science (1858), but printed separately from its proceedings [editors' note: copy in B.L. at pressmark C.T. 316 (4)].
merchant élite that took great pride in the town and in its moral management of it, and to a large population dependent on the irregular labour of dock work and supplemented by the annual arrival (especially in the years preceding Newlands’ appointment) of many thousands of impoverished Irish. These last groups overwhelmed what social and charitable services existed. At least among the élite there was a sense of the progressiveness and potential healthfulness of the place, yet, as the sanitary inquiries of the early 1840s showed, Liverpool was none the less an exceedingly and dangerously unhealthy place. There was also, as in many towns, a disinclination to public expenditure, sometimes on philosophical grounds, sometimes simply in opposition to rates. 7

The second debate was on the management of the physical fabric of the town. The sort of engineering matters Newlands would raise were by no means new. In investing in its docks and in the streets that led to and from them Liverpool’s council in the late eighteenth century revealed itself as an ambitious, perhaps uniquely ambitious, local authority. An Improvement Act of 1786 may in part have reflected the exhortatory efforts of William Moss, a local surgeon, but its main focus was on the commercial matters of widening streets and securing water. None the less, the corporation did recognize that unplanned development was undesirable. It promoted, but failed to carry, a public health bill in 1802, which focused significantly on crowded housing (such an Act did pass in 1842). It insisted that those to whom land was leased for development pave and sewer their new streets and that cellars not be let as separate accommodation, but it did not enforce these rules efficiently. In 1816 the eminent engineer John Rennie outlined an approach for sewering at least the main thoroughfares; his scheme, modified by one of the John Fosters (father and son who were surveyor-architects to the corporation until 1835), guided the work of the sewers commission which had been established in 1820 and was ultimately absorbed into the reformed town

Liverpool's sewers commission, reported Dr Duncan to the Health of Towns Commission in 1844, had spent roughly £100,000 on sewers in recent years. Thus when Duncan complained to the Commission that the present council had a poorer record than its 1802 predecessor in responding to matters of health he was calling for no less than the continuation of a heritage of medically-informed municipal concern and, occasionally, municipal activism.  

While Liverpudlians recognized dock-building and maintenance (and sewer construction) as the province of a skilled engineer, it is not clear that the town recognized, much before the Sanitary Act that brought in Newlands, any need for a co-ordinated engineering response to its various infrastructural problems. It did employ a surveyor to oversee council property, and building surveyors to administer building codes. More likely that recognition came from Edwin Chadwick’s suggestions of what skills and duties local superintendents of public health ought to have. On the one hand Chadwick emphasized a management that was ‘scientific’ (a favourite term) and comprehensive: ‘consolidation of all the structural arrangements, comprising under-drainage and surface-drainage, road structure and repair, under one service, is most required for the sake of efficiency’. Such expertise itself led to an independence from local politics, Chadwick insisted. Once the expert engineer became responsible for the co-ordinated management of a whole set of works, that person


alone acquired a unique perspective and began to cease to be a servant, instructed task by task what to do. Loyalty to a rational plan began to displace the sorts of piecemeal improvements that lay-led local authorities would direct. Such expert co-ordination was imperative if public works were to be built with the efficiency and economy needed to make them truly 'public', Chadwick insisted; the influence of 'petty and sinister interests' was to be combated by the appointment of 'men of independent position with the science and qualifications of civil engineers'. Being both independent and expert, the engineers might acquire a quasi-magisterial capacity; local landowners would come to trust the engineer to adjudicate conflicts over the location and design of works and compensation for the damage they did; it was reasonable to think that legal authority for such judgments might ultimately devolve from parliament to such expert adjudicators. In Chadwick's view such an officer was the most important local public health officer; medical men might usefully serve to inform the public about the disease caused by insanitation, and there might be need for some sort of ongoing sanitary inspection, but the real work of improving the health of the public was to be the task of the engineer.

How far Chadwick's arguments guided Liverpool council is not clear. Testifying to the Health of Towns Commission in 1844, the Tory councillor and builder Samuel Holme did assert the need for each town to employ a 'scientific engineer' (Chadwick's term), familiar with architecture and construction. Perhaps equally if not more important was the town's attempt to find a workable administrative structure, once it had appropriated, under the 1846 Act, the duties of the sewers and highways commissions.

It would appear that Newlands was not the leading candidate for the post. Edwin Chadwick, who as promoter of the Towns Improvement Company was well connected with Liverpool

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10 Ibid., pp. 380–393.
11 Ibid., pp. 396, 410.
capitalists, was pushing his protégé, the young Robert Rawlinson, then employed by the Bridgwater Trust. In letters to Rawlinson, Chadwick boasted of his influence: his acquaintance with the Rathbones, a dinner with the town council. Rawlinson, meanwhile, was serving as an unpaid technical consultant to Chadwick. Rawlinson had, however, become deeply involved in Liverpool’s water supply controversy. He objected to both the leading contenders—Thomas Hawksley’s Rivington Pike plan and the alternative proposal for sinking deep wells in or near the city—and instead called for the building of a long conduit to bring to Liverpool water from Bala Lake in mid Wales. It is likely that Rawlinson’s aggressive self-promotion on so divisive an issue undermined his candidacy and left an opening for Newlands, the outsider.

Rawlinson himself remained in Liverpool for another two years, scratching together a living as an assistant to the architect in the building of St George’s Hall, and trying, with no great success, to establish a consultancy in sanitary engineering.

With this background we can begin to make some sense of Newlands’ definition of the role. As would be the case with many municipal engineers, Newlands’ first main job, beyond administering existing roads, buildings, waterworks, and the like, was to construct a system of sewers. Much of his first year in office was ostensibly spent overseeing a thorough survey of the town and determining what sizes of sewers were needed and where they should run. His first annual report presented those determinations; it began with the tedious technical details of his proposed sewerage system. Yet Newlands did not stop with sewerage; the report went on to outline an integrated system of structural improvements and principles for guiding future development that could transform the health and social relations of the town. It is this expansiveness that makes the report one of the most intriguing and prescient documents of the early public health movement. Like Chadwick, Newlands

14 University College London [hereafter U.C.L.], Chadwick Papers, no. 2181. v. 8, Chadwick to John Moss, 2 Nov. 1844; Chadwick to T. Hawksley, 6 Nov. 1844.
15 U.C.L. Chadwick Papers, no. 1645, Rawlinson to Chadwick, 19 Nov. 1846; 24 Nov. 1846; 12 Dec. 1846; no. 2181, Chadwick to Rawlinson, 20 Nov. 1846.
understood that physical, social, and cultural causes and consequences of disease were interconnected. But rather than arguing that point, as had the barrister Chadwick, he assumed it as a principle of urban design and went on to make clear how it might be put into practice. Concerning himself with everything from the minimum cubic footage of rooms in dwelling houses to the provision of swimming lessons, Newlands saw his job as nothing less than engineering the well-being of a population.

Such a transformation required that one plan the development of the town, and plan it according to some coherent set of technical principles. In the middle of the report Newlands finally acknowledged that he was engaged in town planning, an enterprise that did not yet clearly exist. He wrote that

All extensions of the town should be made in accordance with a fixed plan, in combination with improvements in the direction and width of streets. Such a plan of the increments should be made on the assumption that the whole area of the borough had to be laid out anew, and the lines of the streets determined by consideration of access, sewerage, aspect, and ventilation. It is only by a plan so comprehensive that errors introduced by want of foresight can be remedied, and evils caused by sordid covetousness can be palliated or eradicated. It may be long, indeed, before the plan can be fully realized, in so far as it relates to the improvement of what is already built; but the progress, however slow, will be in the right direction, and therefore satisfactory.  

At the very least, one needed such a plan to work out the proper sizes and arrangement of sewers. With such a plan a set of permanent works could be designed that would assimilate future growth with minimal disturbance. But how was one to formulate such a plan, especially when, as Newlands admitted at the beginning of the report, the principles of sanitary engineering were still in flux? His response was eclectic—a combination of pragmatically leaving options open in some matters (sewage disposal, for example) where significant

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16 James Newlands, *First Report to the Health Committee of the Borough of Liverpool on the Sewerage and other Works, under the Sanitary Act* (Liverpool, 1848), pp. 104–105. Oddly, however, Newlands left this manifesto until the middle of the report rather than beginning with it.
technological progress seemed probable; of insisting that rules, however arbitrary, be set in other matters, as in the laying out of streets, the regulation of new construction, and the provision of amenities; and finally by suggesting a series of novel urban technologies, ingenious in their adaptability, durability, ability to serve multiple functions, and so forth. Among these were sewers with ‘eyes’, to allow easy connection of new house drains, and lamp posts that would contain hydrants, list street names, and, to facilitate calculation of cab fares, give distance from the city centre. A smooth, easily cleaned road paving material was essential for maintenance of health, Newlands maintained; granite setts were best, but costly, yet the expense of durable pavements could be borne, he argued, if streets were not subject to repeated breaking up for the laying or repair of water, sewer, or gas lines. Thus he conceived of under-kerb subway tunnels that would house water, sewer, and gas lines, protecting them from the weight of traffic and allowing easy repair or alteration without street breaking.17

Examples like these show how Newlands, like Chadwick, understood urban technologies holistically. One did not solve technical problems one at a time; one designed a system of works that mutually necessitated each other. This approach did not stop with narrowly technical factors. For Newlands improved health was a chief (possibly the chief) goal of his efforts. His understanding of health was broad, including what one might now call ‘quality of life’ as well as the prevention of infectious disease. Again like Chadwick and many other sanitarians, Newlands held that physical surroundings affected mental outlook and consequently moral well-being. In matters such as minimum house size, or room size, or the provision of parks or baths, technical matters merged into matters of morality, decency, and social ethics.

The key concepts that effected this move from sewer size to social good were light and air. Darkness was incompatible with cleanliness, Newlands insisted, but its effects were not limited to the physical: want of light ‘encourages idleness, and habits of filth, too often accompanied by moral depravity’. The need for ‘space, light and ventilation’ was to be met ‘by a proper width

17 Ibid., pp. 78–80, 99.
and direction of streets; by public walks; by open spaces; such as squares, gardens, and pleasure grounds; and public parks'.

These considerations led to specifications for house design. This was a key move: many of Newlands' predecessors and contemporaries saw crowded housing chiefly as a nidus of the generation of contagious disease. Accordingly they had focused on the demolition of crowded housing without concerning themselves with the health and fate of those displaced; such an outlook had characterized Liverpool's 1842 Housing Act.

Newlands, by contrast, gave great attention to the architecture of health: house width was to be calculated as a proportion (two thirds) of street width; a house 5 yards wide was to be 10 yards deep with a back garden 13 yards deep. Minimum room size was to be 640 cubic feet (10 by 8 by 8 feet); yet even such a room could not support respiration without good ventilation, Newlands advised.

Newlands also considered the effect of designs on social relations. Many people would continue to live in Liverpool's courts, he recognized, but a combination of structural changes could alter social organization and greatly improve the well-being of the residents. 'The inhabitants may be made a cooperative society', Newlands wrote, 'by having a common kitchen, washing, and baking establishment. Such courts as these would be convenient, healthy, and economical. Economical in every respect, as regards construction, warming, lighting, and cleansing, and the saving of time to the inhabitants.' Public wash houses were necessary even though they tended to 'destroy love of home' and bred 'gossiping', but mangles should not be provided in the wash houses lest the poor women who lived by mangling be put out of work.

What warranted this far-reaching social engineering? Chadwick had appealed primarily to political economy: the rationale for sanitary intervention was that eliminating disease eliminated pauperism. Sewers were the cheapest form of poor

18 Ibid., pp. 106–107.
20 Newlands, First Report, pp. 109, 133.
relief. Newlands drew on similar arguments, but he drew also on concepts of collective responsibility and personal morality that were quite foreign to the Chadwickians and reflected the ethos of Alisonian Edinburgh or of Renshaw Street Unitarianism more than the Manchesterianism of Chadwick. Indeed political economy was explicitly objectionable: 'what arithmetic will enable us to compute the value of the lives which are daily lost, the anguish which the sufferers feel?' Newlands asked. He took the public health problem to be a direct consequence of the sin of greed on the part of developers of property:

The health of a community is public property, and from its deterioration the public suffers. From the over-crowding of the population, and the structural defects of our towns, the result of a sordid desire of the individual to benefit himself, at whatever risk, arise a high rate of mortality, unnecessary sickness, widowhood, and orphanage. From the same causes ensues the necessity for providing hospitals, dispensaries, workhouses, and the various other institutions for the relief of sickness and distress, and a worse necessity, the providing of prisons for the punishment of crime.

Accordingly, the ultimate solution lay in recognition of duty:

'Property', it is well said, 'has its duties as well as its rights'; rights unfortunately too often sustained by the wrongs of the community; and although avarice must, for its own sake, provide checks to its rapacity, that it may not cease to have a victim, we yet daily see streets set out and houses built with such disregard to human health, as to invite the approach of nature's avenging maladies. Surely, then, he who abuses his trust, by perpetuating this frightful evil, must be made by the strong hand of the law to understand that the right compels the duty.

For Hugh Shimmin, the muck-raking journalist who served as Liverpool's conscience, this integrated moral/architectural/


22 James Newlands, First Report, p. 104.
engineering perspective was properly understood as the “Religion of Newlands”—good paving, enforced cleanliness, and plenty of light. It was this religion, not that of evangelical preachers, which was needed in Liverpool’s courts.

What is most striking about this report is its audacity. Here was a young professional without a substantial track record in his profession, an outsider in a town where political, commercial, social, ethnic, and religious networks were exceedingly important, taking on an ill-defined and insecure post in a profession that did not yet exist. Yet he had chosen to cross an engineering report on the laying out of sewers with a socialist manifesto and gone out of his way to object to a form of economic life that many in the town practised and/or endorsed. Perhaps Newlands simply thought he had nothing to lose; the report was just the gamble of a rootless but idealistic young man who knew he could get on quite as well elsewhere. Or perhaps it represents a shrewd appraisal of the contemporary political climate in Liverpool. Both may well be the case; certainly many of the points Newlands raised—from the need to regulate housing to the importance of baths and wash houses—had been raised periodically before, in some cases for the better part of half a century. In some cases the proposals were favourite themes of local charitable activity. Yet it was one thing when such views came from a Unitarian pulpit; quite another when a vision for Liverpool came from a municipal servant and administrator. Whatever Newlands’ motives, the report is unique in its explicit tying of engineering design to social ethics. Municipal engineers of other towns did not produce similar documents; however much they might share Newlands’ belief in the power of infrastructural change to transform social relations, they usually found it prudent to keep those claims quiet and to represent themselves as exclusively technical professionals, their work uninfected with politics or ideology. Newlands’ later reports (coming every few years until 1869) rarely strayed from technical matters.

All the while, Newlands’ activities were also being scrutinized from other quarters; not only had he to maintain the confidence of Liverpool’s council, but both Chadwick and the civil engineering elite in London were seeing his work as a test

23 Quoted in Fraser, Power and Authority, p. 42.
case of whether a municipal engineer could function successfully without state oversight. By the late 1840s Chadwick had become thoroughly disenchanted with private-practice civil engineers. He had come to think of civil engineers as incompetent and corrupt, regularly designing unnecessarily costly works in order to increase their fees. With the aid of a few renegade engineers, he had come up with a strategy for significantly lowering the cost of urban sanitary improvement, based on developing networks of carefully graded self-scouring ceramic sewers. The refusal of most engineers to endorse his proposals only confirmed his distrust of the profession and ultimately led to an acrimonious ‘pipe-and-brick sewers war’ that was at its worst from 1852 to 1854.

Thus, what Newlands was doing as a pioneering municipal engineer in Liverpool, a town that had not elected (or been forced) to come under the Public Health Act of 1848, inevitably would be imbued with great significance, the more so as Newlands was neither a Chadwick protégé nor a member of the inner circle of London engineers. Although Newlands adopted many of Chadwick’s suggestions, he did not adopt them as a doctrine, and because he kept himself outside Chadwick’s orbit he eventually became something of an engineers’ hero, even though he made no effort to represent

24 Chadwick believed Newlands’ aggressiveness was related to a provision in the Liverpool Act under which approval of the Home Secretary was required for his dismissal. He wrote in 1848 that had this provision not existed, ‘The Town Council [of Liverpool] would have stopped his making recommendations which they could not decline adopting by dismissing him.’ He saw Newlands as being significantly more effective than Duncan, whose activities, he believed, were being constrained by the council (U.C.L. Chadwick Papers, no. 1771, Chadwick to the duke of Buccleuch, 11 July 1848). I believe Chadwick’s assertions reflect his attempt to heighten the need for central control by emphasizing the irresponsibility of local government; it strains credulity to think that Newlands would trust his career to the protection of an overworked Home Secretary, who appears to have shown no interest in his appointment (P.R.O., HO 45/1824). And certainly the town council appears to have felt no obligation to follow Newlands’ advice in all particulars.

himself as a spokesman on sanitary engineering. Also affecting Newlands' reception in London was the continued presence in Liverpool, through 1847 and well into 1848, of Robert Rawlinson, Newlands' former rival for the post, who was still dependent on Chadwick's patronage. In Rawlinson Chadwick had an expert critic on the scene with motive for magnifying Newlands' departures from Chadwick's orthodoxy.

Thus during 1848 two images of Newlands battled for dominance in the sanitary engineering community. Was he a responsible, competent, and innovative engineer, as the engineering press would have it, or an incompetent squanderer of public funds, as Chadwick would suggest? The substance on which these interpretations were based was the sanitary survey of Liverpool, the principal activity on which Newlands' staff had been engaged during his first year in office. There were two issues, first whether a highly detailed survey was necessary, and second whether Newlands and his staff had done such a survey efficiently and competently. Chadwick believed a thorough and complete level survey was essential for a co-ordinated sewerage plan, even though many other sanitary engineers saw such surveys as unnecessary. Newlands, however, shared Chadwick's view: economy, reliability, and salubrity all depended on having a co-ordinated set of sewers. They differed as to who could best do such surveys. Chadwick held that surveyors in private practice were frequently incompetent, there being no adequate professional institutions to guarantee their work, and that their charges were absurdly high, over-inflated by the demands of railway construction. He thought such work should be done by the Ordnance Survey or by the Corps of Engineers, where there were clear channels of authority and responsibility.

26 U.C.L. Chadwick Papers, no. 1645, Rawlinson to Chadwick, 13 Nov. 1847, 15 Nov. 1847; Chadwick to Rawlinson, 16 Nov. 1847; Rawlinson to Chadwick, 29 Dec. 1847.
engineers and surveyors, the more so when Chadwick, through his control of the Metropolitan Sewers Commission, succeeded in having the Ordnance Survey do surveys for a new sewer network for London. For much of 1848 the engineering press assailed Chadwick, insisting that military engineers and ordnance surveyors were the incompetent ones.²⁹

Each side looked to Newlands’ Liverpool survey as the key evidence that would make its case. The Chadwickians claimed that the survey was taking too long, costing too much, and repeating, incompetently, the earlier work of the Ordnance Survey. Such claims were made notwithstanding enthusiastic assessments which Chadwick was receiving from confidants on the scene. On Christmas Day 1847 Dr John Sutherland, a young Liverpool practitioner who later became one of Chadwick’s medical inspectors at the General Board of Health wrote to Chadwick on Newlands: ‘a clever intelligent man fully up to his duty’. Newlands’ survey would be finer than that of the Ordnance Survey, he added. Four days later Rawlinson wrote of Newlands’ work (it seems likely that Chadwick had requested confirmation). Rawlinson was not quite so enthusiastic, but admitted that Liverpool had basically made a good start.³⁰ Their praise was to no avail; as a private practitioner and employer of private surveyors Newlands was marked as part of the opposition.

The engineering press naturally took quite the opposite view: Newlands could not be incompetent. He and his staff were not sinecured civil servants, but had continually to prove their competence to Liverpool and that in itself ensured that their work must be good: ‘the fact . . . [was that] the military engineers are virtually irresponsible—they cannot be made to perform their work properly or punctually; while the civil engineer, at Liverpool for instance, is responsible in his professional character


³⁰ U.C.L. Chadwick Papers no. 1920, Sutherland to Chadwick, 25 Dec. 1847; no. 1645, Rawlinson to Chadwick, 29 Dec. 1847. Later, Rawlinson did take more significant issue with Newlands’ approaches (ibid., Rawlinson to Chadwick, 17 Oct. 1853).
and capacity, and liable to be dismissed by his employer if he do
not give satisfaction.’ 31 A year later the tables were turned: a key
factor in the downfall of the Chadwickians from their control of
the Metropolitan Commission of Sewers was the slowness of their
surveys, carried out by the Ordnance Survey under the direction
of Captain W. Yolland (who had been Chadwick’s authority for
asserting the inadequacy of Newlands’ survey). 32 Newlands
characteristically refused to become a pawn of either side. He
devoted several pages of his first report to the survey, admitting
that it had taken too long and cost too much but had been
necessary none the less. 33

The comprehensive surveys issue was only one of several on
which Chadwick and the engineering profession were at
loggerheads. They did not agree on such fundamental matters
as what hydraulic equations described flow through pipes, and
hence had different ideas of how large sewers needed to be.
They disagreed as to materials for sewer construction,
Chadwick favouring earthenware pipes, the engineers
maintaining that brick sewers, though costlier initially, were
easier to repair or modify, and better withstood distorting
forces. Here too, Newlands, as far as possible, kept himself out
of the controversies. In principle, he tended toward
Chadwickian views. For example, while previous writers had
conceived of Liverpool’s sewers chiefly in terms of soil drainage,
Newlands, like Chadwick, understood them to serve the
additional functions of waste disposal and street cleansing. At a
time when there was by no means universal acceptance of
water-closet removal of human wastes, he, like Chadwick,
insisted on this mode of waste disposal. Newlands’ sewers
(covered, ventilated, laid at a gradient to ensure self-scouring)
were thus to prevent contamination of the atmosphere, and to
serve as a means of transporting waste to places where it could

31 ‘Review of Newlands, Report to the Health Committee’, Civil Engineer’s and
Architect’s Journal, XI (1848), p. 278; cf. ibid., pp. 17–18, 39–41, 121–122,
198.
32 The Times, 27 July 1849, p. 6f; 30 July 1849, p. 3d; 31 July 1849, p. 7e;
4 August 1849, p. 4e–f.
33 Newlands, First Report, pp. 139–142. Newlands did protest in autumn
1852 that he had been misquoted in the controversy on pipe drains: Minutes of Proceedings of Institution of Civil Engineers, XII (1852–3), p. 91.
be safely recycled as fertilizer, the last function likewise being regarded as an essential principle of sanitary sewerage.

Yet Newlands the pragmatist, working within the real constraints of the geography and culture of Liverpool, recognized, as did engineers in other towns, that principles could not always be followed. Fundamental compromises were sometimes necessary. The topography of Liverpool, for example, along with the rudimentary state of sewage utilization techniques made sewage recycling unfeasible—too much land would be required. Nor could one count on the sewers to be self-scouring; it would be necessary to flush them with high pressure water. 34 No matter how much he might endorse particular proposals of Chadwick’s and even the holistic approach to urban planning and engineering, the pragmatism mandated by the working environment left Newlands more in the engineers’ camp than in the Chadwickians’. The reason was that the division between pragmatism and principle was far more deeply seated than any disagreements about particular sanitary technologies. The two sides had quite different conceptions of the character of engineering expertise and the appropriate social location of sanitary engineering practice. Chadwick conceived that through experiment there could be derived a system of sanitary infrastructure, including constant-pressure water supply, sewers, and sewage irrigation works, that would be broadly applicable to any town. Backed by the authority of central government, the engineer’s task was to adapt that system to a particular town. To the British civil engineering profession, however, this seemed an unacceptable derogation of professional responsibility; they saw themselves not as mere appliers of formulae, but as skilled consultants who could draw on a great range of tools to design works uniquely suited to the commerce, finances, perceptions of need, and topography of each client town. This perspective, in which the town ultimately had to decide what it wanted to be, acknowledged that it might be necessary to design only partial works, inadequate to the sanitation needs of a town, but better, perhaps, than no works at all. What an agent of central authority might get away with, a servant to a town council might not. 35

35 Hamlin, ‘Chadwick and the Engineers’. 
That was to be the case with Newlands. In refusing to be labelled a dogmatist and in presenting his suggestions quietly and internally as the expert’s advice to a client, rather than as the sort of crusader’s manifesto that Chadwick broadcast, Newlands was following precisely the role that the profession’s leaders suggested and usually exemplified.

As would many later municipal engineers, Newlands soon found himself overwhelmed with details of administration, and the visionary, Chadwickian quality that characterizes his first report is largely absent from his later reports. These boasted of the miles of sewer that had been constructed and reviewed the management of his growing staff and the reports he had written on various matters for council committees. Occasionally he reiterated particular proposals from the 1848 report. Kerb-side tunnels, for example, remained desirable since unauthorized breaking up of streets continued to interfere greatly with the normal conduct of business. Or he measured the progress in implementing his proposals: 56 urinals had been built in the last two years, Newlands noted in 1853, but 84 were still wanted (one can but speculate how he arrived at this precision).36

By no means did Liverpool adopt Newlands’ programme in its comprehensive form, but enough of it was carried out to make the city the leader in many areas of structural improvement.37 With regard to housing, for example, Liverpool was one of few towns that made an effort to replace the substandard housing it demolished, and this was partly due to Newlands’ prodding. In 1864 it acquired permission to demolish insanitary housing; in 1869, St Martin’s Cottages, first of the town’s public housing projects, were completed.38 Many of the proposals Newlands made (for example the setting aside of significant amounts of land for parks or boulevards) turned out to be unexpectedly costly; others (like the mandatory

37 White, Corporation of Liverpool, p. 100.
38 No additional public housing was constructed until the mid 1880s, however: ibid., pp. 60, 64, 132–133; Handbook, ed. Hope, pp. 142, 163–167.
replacement of privies with water closets and connection of the latter to the sewer system) antagonized a significant number of owners of property.\textsuperscript{39} It would appear, however, that Liverpool was relatively well-run under Newlands. Due to the unreliable performance of scavenging contractors, in 1865 he established and administered a municipal scavenging service. Streets were swept daily and watered twice weekly.\textsuperscript{40} In the late 1860s complaints about Newlands' sewers were raised by those objecting to the mandatory conversion of privies into water closets, but an independent investigation conducted by E. A. Parkes and J. Burdon Sanderson endorsed them. Newlands administered massive employment schemes for snow-shovelling during the high unemployment periods of the early 1860s.\textsuperscript{41}

In a period in which almost any project of municipal improvement was politically vulnerable for a number of reasons, and in which even the idea of employing a municipal civil servant to administer much of the city's prosperity and a large labour force, to design and oversee construction of major public works, and to chart a course for the physical development of the city was a novel one, Newlands did remarkably well. His reign was not without controversy yet it was free of extreme and disrupting controversy. Newlands quietly boasted in his 1863 report that of the work of the health committee, 'a great portion . . . has interfered with private rights, [yet] no unfriendly feeling has been manifested by any of the parties affected.'\textsuperscript{42} The measure of this was that no one had requested compensation for damages, and judging from the records of other contemporary municipal authorities that is a significant claim to be able to make. It seems probable, however, that Newlands could not have accomplished what he did without remaining modest, inconspicuous, and remarkably thick-skinned: one role of the municipal engineer was to act as

\textsuperscript{39} White, \textit{Corporation of Liverpool}, pp. 50–51, 83–85.
\textsuperscript{42} Newlands, \textit{Report to the Health Committee} (1863), p. 37.
scapegoat both for public complaint and in partisan municipal politics. One was likely to hear a great many unpleasant things about one’s competence expressed in decidedly unpleasant ways. Thus, to accomplish what he did Newlands had to appear to be doing less than he was. In a town where the exhibition of philanthropy was a great part of the manifestation and maintenance of social status, the engineer could not afford to pre-empt the community of social reformers, however much he might be the provider of reforms more lasting and far-reaching. Always it was necessary for others to take credit; this might mean manipulating matters so that others, a council sub-committee on the condition of courts and alleys, for instance, would be led to inspect regularly and take appropriate action.43

Presenting significant reforms, reforms that took issue with fundamental principles of the dominant ideology, as merely technical solutions to merely technical problems was also a way of minimizing their controversial character. To conduct politics successfully one had to be apolitical. For Victorian writers ‘engineering’ both suggested great change and avoided recognition of choice in that change; politics dissolved into administration.44 Thus, under the guise of an engineering report one could even directly point out needs for legislative changes. Newlands pointed out in his 1869 report that ever since 1851 he had directed the council’s attention to anomalies in the Building Act. Yet ‘somehow members of the council were not in accord with the necessity for the proposed improvement’, so it was necessary for him to repeat these facts.45 Here Newlands represented himself as the mouthpiece of engineering truth. It was the political process that was at fault in failing to respond. Thus to speak as an engineer could, without acknowledging it, effect a virtual reversal of roles; the ostensible servant, Newlands, could claim to dictate policy.

44 See ‘Engineers and Shareholders’, Engineering, V (1868), pp. 597–598.
Yet inconspicuousness had its price. As the first municipal engineer, and as engineer to a city with tremendous prestige and power, Newlands was uniquely placed to make public what municipal engineering was to be. He gave his profession form and substance but, ironically, his example was not and could not be public, for deference and inconspicuousness were themselves parts of the profession as Newlands understood it. After the fall of Chadwick, this left the profession of municipal engineering—if one can call it that—virtually leaderless, for roughly twenty years, when Lewis Angell, the engineer to West Ham, enlisted his colleagues to form the Association of Municipal and Sanitary Engineers and Surveyors in order to protest against the virtual exclusion of municipal engineers from the deliberations of the Royal Sanitary Commission.  

While the Association provided a framework for the discovery of professional consensus, and for working out and enforcing customary conditions of employment for municipal engineers, it did little to make their role more conspicuous. Indeed, it is still frequently the case that local histories of British towns will cite the medical officer of health by name, while the borough engineer or surveyor to the board will remain anonymous, it evidently being assumed that they were mere functionaries, diligently doing jobs that involved the making of no significant decisions, and therefore in no need of a biography (or even a name). Newlands had succeeded all too well. In the early twentieth century, when a new profession, that of the town planner, publicly declared its territory to include much of what had quietly been the business of Newlands and his colleagues, the municipal engineers protested.  

But it was too late to end their anonymity.

Had Newlands’ relations with Chadwick not been so poor, it might well have been otherwise. One can conceive a more vocal Newlands inducing Chadwick to incorporate his experience, or alternatively engaging himself more enthusiastically as a

champion of independent engineering. Quite possibly he could have done so without undermining his situation in Liverpool. That he, and others, did not do so contributed significantly to the development of a gap that persisted throughout the nineteenth century, between the ways municipal governments and central government responded to issues of health and public works. By and large they responded independently of one another. Parliament and the engineering inspectors from the Local Government Act Office and later the Local Government Board came to exercise only minimal control over the public health works that towns built; their medical inspectors would descend for a few days of investigation and then disappear, later sending along a report that might or might not be acted upon. Only gradually, with the establishment of intermediary county councils and the development of more thoroughgoing ministerial responsibility over medical officers of health and other permanent officials of local government, was this gap bridged.48
