

REVIEWED PAPER

33rd WEDC International Conference, Accra, Ghana, 2008**ACCESS TO SANITATION AND SAFE WATER:
GLOBAL PARTNERSHIPS AND LOCAL ACTIONS****A new global sanitary revolution: lessons from the past***Ben Fawcett & Maggie Black, UK*

The nineteenth century sanitary revolution that occurred in Britain and the industrializing world has several valuable lessons for the similar revolution that is now needed to enable 40% or more of the world's population to access improved sanitary facilities and services. These include the time needed to bring about significant change and resulting health improvements; the role of both private and public sectors and individual and collective action; an understanding of motivation for behaviour change and the necessary expenditure; emphasis on the excreta-related nature of much disease commonly termed 'water-related'; and consideration of a range of affordable solutions, from dry technologies to sewers, each being appropriate in the right socio-economic circumstances. Above all, a new group of sanitary heroes, comparable to Chadwick and Bazalgette, is needed to give impetus to a 21st century revolution.

'The Great Stink', London, 1858

Exactly 150 years ago, an exceptionally hot summer reduced the river Thames to a scandalous condition known as the 'Great Stink'. The smell off the river was so excruciating that Parliament could barely sit, and sessions in the adjoining Courts of Law had frequently to be curtailed. London then suffered regularly from cholera, and it was still automatically assumed that air-borne 'miasma' was responsible for its spread. The Stink concentrated the MPs' minds on legislation. The act they rushed through led to the transformation of sewerage in London by Sir Joseph Bazalgette, and eventually to a widespread public health engineering revolution in Britain and throughout the industrializing world.

A new sanitary revolution is desperately needed, on behalf of the 40% of the world's population who are without a decent and hygienic means of dealing with their personal waste every day. In the rapidly urbanizing developing world, still only a fraction of sewage is treated before ending up in heavily polluted, and stinking, rivers. Much excreta is washed into them - as in 1858 London - by stormwater drains filled with 'excrementitious effluvia' that is either deposited in the open or dumped at night from cesspools and latrine pits. Great Stinks are by no means altogether banished to the past.

The story of the 19th century sanitary revolution in Britain has been retold so often that its main figures - men such as Bazalgette, Edwin Chadwick the father of 'public health', and Dr John Snow - have developed mythological stature. Some of its most instructive lessons for today's sanitary transformation are buried below layers of historical spin.

The need for time

One such feature is the length of time it took, both to build infrastructure and to change people's behaviour. The transformation of the urban living environment into something sewered with plentiful safe water on tap, not only in the houses of the better-off with their flushing WCs, but in the cottages and tenements of ordinary working people, took over six decades to accomplish. This sanitization of urban settings was ultimately credited with eliminating squalor and epidemic disease, but the radical impacts on life expectancy and infant mortality rates did not show up until well past the turn of the 20th century (Smith, 1979, pp196-198). The period allowed for achievement of the Millennium Development Goals throughout the developing world is minimal in comparison with this earlier experience.

The long process of legal, municipal, and sanitary reform in Victorian Britain was accompanied by heroic efforts by engineers and reformers on many fronts, and many U-turns in public policy. Many original diagnoses of urban public health problems were wrong, or where they were right, took time to gain acceptance. Social and class attitudes were also in the process of transformation as were all aspects of economic and political life. Industrialization represented an extraordinary social upheaval, of which the sanitary revolution was

both a symptom and a result. The struggle to clean up the towns was long and hard, and the much-celebrated legacy of the sanitary component has shaped theory and practice surrounding public health ever since.

A role for both private and public sectors

In the early part of the 19th century transformation, the private manufacturing sector was critical in producing the toilet, along with taps, pipes, pans, basins, cisterns, U-bends, valves, cocks, spigots, and all kinds of bathroom and sanitary ware. All this happened in response to demand for home improvement – and in fact it was the consumer take-up of flush toilets and their voluminous output that led to the Great Stink of 1858. But the mass disposal side was another matter. To begin with, private companies were much involved in water supply and sewerage construction - no other providers were envisaged. But the leaders of the sanitary movement became convinced that the extraordinary state of filth in the slums could not be addressed without decisive public action. The roles of local and central authorities became a battleground, requiring political intervention in intimate areas of people's lives, a series of Public Health Acts, and municipal public expenditure, supported by central government loans, on an unprecedented scale. It became clear that private companies were not willing to provide water mains and waste disposal to those outside the 'respectable' classes: the costs were too high and the demand - in the form of ability or willingness to pay - much too low.

Surely these lessons are valid for the contemporary developing world. Public health is a public 'good'; the indiscriminate disposal of one person's waste has an inevitable impact on the health of neighbours. Basic quality standards must be respected in sanitation and services must be provided to ensure 'good health for all'. Public authorities are needed to ensure standards of construction, operation and maintenance, to provide fair subsidies to the poorest and most vulnerable who simply cannot afford the expense of a new toilet, and to ensure services for pit emptying and safe sludge disposal. Likewise, local, private suppliers of sanitation services, for construction, maintenance and pit emptying, need training - both in appropriate engineering and business skills - support and regulation. A mixed economy, including both strong, well educated and resourced municipal departments and a wide range of skilled providers of essential services - the 'small-scale providers of current jargon' - needs to be developed and supported to provide and manage the facilities to achieve 'public health'. Likewise, appropriate legal and institutional frameworks are needed, and very significant financial support, including household, community, municipal, national and international contributions, is essential.

Water- or excreta-related disease?

The public health motivation for changes in 19th century London only applied when it became clear to the better-off that they were threatened by diseases circulating in the poorer parts of town. In this, the miasma theory of disease - Edwin Chadwick resolutely believed that 'all smell is disease' (Eveleigh, 2002, p11) - and the panic induced by cholera were on the reformers' side. Their enthusiasm for underground sewerage was therefore primarily related to the disease-spreading nature of the stink. Interestingly, modern research suggests that there is a strong co-relation between the instinctive human reaction of disgust and proximity to disease-carrying agents (Curtis, 2001). However, Chadwick and his contemporaries thoroughly misread the nature of the connection.

The connection between the spread of cholera and foul water was first discovered in one of the most famous incidents of sanitary history, when Dr. John Snow carried out an epidemiological survey in a part of Soho, London, during the 1854 epidemic. He painstakingly enumerated every facet of the local houses, inns and shops, and the water-consumption patterns of their inhabitants - a scientific method which was itself relatively novel. He proved that the imbibing of water, or beverages made from water, from a particular public pump in Broad Street was the essential common denominator in the majority of cases. He noted that many people drew water from this pump because they preferred it to that from other pumps; this was the cause of cases outside its immediate vicinity. On the basis of his findings Snow managed to have the handle of the pump removed. (Cosgrove, 1909) The closing of the Broad Street pump has become an iconic moment in the birth of public health, but, at the time, Snow was ignored; the miasma theory was so well entrenched that, only after another epidemic in 1866, was Snow's evidence of water-borne infection given some belated recognition.

Today it is difficult to imagine a world in which scientific information on a matter of such importance took so long to become established and widely known. Except that it is still the case in parts of Africa, and wherever illiteracy is common, that belief in the miraculous propagation of disease by witchcraft or curse remains current, even among some highly-educated members of society. Preference - both with regard to

drinking water source and long-established excretory habits - is therefore an important consideration in understanding behaviour, convictions and consumer tastes in many settings. Without such an understanding of local attitudes, beliefs and practices we cannot hope to develop approaches to behaviour change that are relevant to that context, and so to bring about the necessary clean-up.

In the subsequent re-telling of the glorious Snow moment, a curious transposition has occurred. The lesson passed down to posterity is far more closely associated with the safety of drinking water as the key to disease control, than with the dangers of inadequate sanitation. And the pre-eminence of Snow in the story has ejected another important claimant from his share of diagnostic fame. The Reverend Mr. Whitehead, curate of a nearby parish, and like Snow a member of the Cholera Inquiry Committee, also carried out a house-to-house investigation in the area. Whitehead delved deeper than Snow into the mystery of how the well had become infected. In House No 40, Whitehead discovered that there had been an earlier case of a cholera-like disease, and that 'dejecta' from this patient had been thrown into a cesspool very close to the well. A surveyor found the brickwork of drain and cesspool highly defective, with a steady percolation of fluid from the privy into the well. Whitehead thus not only confirmed Snow's water-borne disease theory, but pin-pointed the cause. If he had been the subsequently celebrated hero instead of Snow, perhaps diseases that have ever since been inaccurately characterized as '*water-related*' might have been better termed '*excreta-related*', thus avoiding many subsequent misperceptions and wrong policy choices. Whitehead also concluded that the water had only been infected for a very few days, and instead of multiplying, the cholera germs had died out. He attributed this to the coldness of the water - cited as the reason consumers preferred that pump. Thus preference for a particular water supply may not be so misleading as a quality for protection from disease as is often assumed.

Sanitation has always been a poor relation to water supply in public health engineering, but its importance is paramount. Engineers must overcome their distaste for this dirty subject and become vigorously involved with a wide range of other professionals - from behavioural scientists to environmental economists - in order to really tackle the scourge that is still causing massive misery, indignity and even death amongst the billions of the poorest and most vulnerable on earth.

'Dry' or 'wet' sanitation?

Four years after the Broad Street investigations, when the Great Stink occurred and legislation was finally propelled onto the statute book in 1858, public alarm was widely expressed that the huge £3 million cost of the works to be constructed in London would be spent in vain by an untried and unknown public body set up for the purpose. Does this sound familiar? Many commentators objected that emptying the contents of millions of Londoners' bowels into the Thames, duly treated and sanitized, via a special pumping station downstream, would represent an extraordinary and expensive waste of valuable manure, which for centuries had been applied to the fields around London's outskirts. This debate was to run and run. For many decades, there continued to be a spirited contest between the proponents of water-borne sewerage for the sanitation of towns, and those advocating what was known as 'dry conservancy'. In this latter system, toilets would be flushed with sifted earth, solid excreta were to be collected and applied to agricultural use, and rivers would thereby be saved from 'feculent corruption'. In 1861, a German professor, Justus von Liebig, published a book entitled *Agricultural Chemistry*, in which he proclaimed: 'The introduction of water closets into most parts of England results in the loss annually of the materials capable of producing food for three and a half million people' (The Builder, 1861).

An equally ardent believer in 'dry conservancy', the Revd. Henry Moule, took out his first patent on an earth closet in 1860. Within three years, two of his models were being manufactured and widely sold. The protracted stand-off between the cleansing properties of 'wet' versus the manuring capacities of 'dry' is very similar to the stand-off today between advocates of ecological sanitation and enthusiasts for the water-flush. When it comes to consumers, the olfactory and aesthetic appeal of the U bend and water seal seem to be virtually universal - where they can be afforded and adequate water is available. But in the late 19th century, as today, the champions of water-flushing were by no means always in the ascendant.

Advances in agricultural science had stimulated both the manufacture of super-phosphates - the first chemical fertilizer - and the import of *guano* from Latin America in the 1840s. These were expensive, so there should have been demand for alternatives. During the late 19th century, over 100 large towns and cities in the UK launched schemes for the collection and distribution of sewage as manure on the expectation of healthy profits. As late as 1911, two-thirds of Manchester's inhabitants lived in houses which depended on pails, ash-boxes, or a privy midden (Wohl, 1983, pp98-99). But there were many problems with the recycling

of excrement: cartage was expensive, and storage posed problems of public nuisance. In the end, it turned out that no large town was able to make money out of human muck.

The long experience in British towns with 'dry conservancy' has been forgotten, and the lack of profitability and other characteristics which made it inferior to water-borne sanitation, and finally eclipsed its use altogether, ought to be studied carefully by today's enthusiasts for ecological sanitation. The lessons of its abandonment do not mean that improved methods of dry sanitation and nutrient re-cycling are universally unworkable; the political economy of sanitation in the many different settings of the contemporary world has important differences from those in late 19th century Europe, but nonetheless valuable lessons may be found.

Conclusion

What cannot be disputed is that - with all the trials and tribulations of its slow adoption - waterborne sewerage proved itself as the hygienic and aesthetic preference in the setting in which it was invented. Its success over time was remarkable. What was also remarkable was that the sanitary reformers managed to make sewers and stinks part of the discourse of the Victorian age, even in newspapers and magazines read by polite society. The opening of Bazalgette's southern intercepting sewer outfall into the Thames east of London in 1865 was attended by the Prince of Wales and numerous distinguished guests who dined on salmon while the city's excreta gushed forth beneath them (Wohl, 1983, p107). In the 21st century, celebrities and society leaders are happy to attach their names to campaigns on water, but rare are those to have identified themselves unreservedly with the need for sanitary advance.

How can the level of Victorian political will and public investment be regenerated on behalf of the 2.6 billion people unserved by decent facilities in the developing world today? Since those days, with the exception of Mahatma Gandhi's protestation that 'sanitation is more important than independence', the efficient and hygienic disposal of human excreta has not again become a matter of major public campaigning or moral reform in the world at large. The extraordinary accomplishments of the 19th century generation of sanitary heroes has succeeded in putting excreta, its hazards, and its removal from homes and streets out of sight and out of mind. Today, finally, burgeoning urban populations, high levels of water and soil pollution, squalor in slums and crowded settlements, municipal mismanagement and need for reform, and epidemics of diarrhoeal disease posing serious threats to human life are pushing these issues back up the agenda. The International Year of Sanitation is an example of this new emphasis.

In 2007, the Yamuna River flowing through Delhi is filthy, polluted and fouled by human excreta; vast expenditures on sewage treatment have so far failed to clean it up. (CSE, 2007) Stinks, therefore, are still part of the armoury for promoting sanitary reform. With the demise of the miasma theory, cholera carried on the breeze no longer instils the terror it once did; but the pollution and even the death of rivers remains an important impetus. Charismatic and committed toilet missionaries are needed as never before to set the next sanitary revolution in motion.

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Note

Ben Fawcett and Maggie Black are co-authors of the recently published book: *The Last Taboo: Opening the Door on the Global Sanitation Crisis* (Earthscan, March 2008). This paper is extracted and abridged from material in the book.

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Contact details

Ben Fawcett

Email: benfawcett@linknet.com.au

Maggie Black

Email: Maggie@maggieblack.com
