Extract from Porter, Roy. *The Greatest Benefit to Mankind: A Medical History of Humanity*. New York: Norton, 1997.

A significant breakthrough against cholera was effected by Snow. Born in York in 1813, he had become a surgeon in Newcastle upon Tyne, gaining experience of cholera during the 1831 epidemic. In 1836, he set up in London's Soho, and became established as London's leading anaesthetist. As cholera spread again in 1849, *The Times* printed the following appeal:

> Sur,
> May we be and beseach your proteckshion and power. We are Sur, as it may be, livin in a Wilderness, so far as the rest of London knows anything of us, or as the rich and great people care about. We live in muck and filth. We aint got no priviz, no dust bins, no drains, no water-splies, and no drain or suer in the hole place. The Suer Company, in Greek St., Soho Square, all great, rich powerfool men take no notice watsomdever of our complaints. The Stenche of a Gulley-hole is disgustin. We all of us suffer, and numbers are ill, and if the Cholera comes Lord help us.

Snow's first cholera investigations appeared in his *On the Mode of Communication of Cholera* in the same year, when over 50,000 people died [412/413] in England of the disease. Questioning miasmatism, he argued that cholera could not be spread by a poison in the ambient air, since it affected the intestines not the lungs. He drew attention to the contamination of drinking water as a result of cholera evacuations seeping into or running into rivers from which drinking-water was taken. He was sadly, soon able to put his views to the test.

In August 1854 cholera cases began to appear in Soho. A drastic increase in the week ending 2 September led him to investigate all 93 local cholera deaths. He concluded the local water supply had become contaminated, for nearly all the victims used water from the Broad Street pump. At a nearby prison, conditions were far filthier, but deaths were few – it had its own well. On 7 September he requested the parish Board of Guardians to disconnect the pump. Sceptical but desperate, they agreed; the handle was removed, the number of cases plummeted (the outbreak was already declining), and Snow had confirmation of his theory.

In 1855, he gave his views to a House of Commons Select Committee: cholera, he maintained, was not contagious nor spread by miasmata but was water-borne. He advocated massive improvements in drainage and sewage, a call that played some part in the investment by London and other major British cities in new main drainage and sewage systems. After “the great stink” in the summer of 1858 caused Parliament to break off its proceedings, the Metropolitan Board of Works empowered its engineer, Joseph Bazalgette, to create an ambitious scheme for drainage, which was completed in 1875. London's water was increasingly drawn from the higher reaches of the Thames and from the Lea Valley, and filter beds were developed. The new sanitary infrastructure was a triumph of civil engineering.

Snow won converts to his view of cholera as a specific, water-borne disease. Similar ideas were emerging with typhoid, distinguished from typhus by William Gerhard of Philadelphia and William Jenner. In 1856 the Bristol physician, William Budd, argued that the typhoid agent lay in patients’ stools and thus, by implication, was due to poor hygiene and living conditions. He recommended washing, disinfection of cisterns, and boiling water during epidemics. Nevertheless, the question of the causation of urban epidemics was confused and contested. Many experts, including the influential Farr, remained committed to a more traditional and generalist model of fevers, regarding them as unspecific manifestations of insalubrity. Lumping together as “epidemic, endemic [413/414] and contagious” all those maladies “known by experience to become epidemic in unhealthy places and among the sickly classes”, Farr called them zymotic diseases, reflecting Liebig’s concept of disease as analogous to fermentation: certain terrestrial and environmental circumstances would cause diseases to be released into the atmosphere. Zymosis explained how a disease suddenly became epidemic. The *materies morbi* involved “highly organized particles of fixed matter”, possibly resembling pollen, in a state of pathological molecular transformation Non-specific decomposing organic matter was a “predisposing” cause in a causation chain dominated by a zymotic stimulus (412-14).