

DOCTORS WHO SELF-EXPERIMENTED TO ADVANCE MEDICINE

By Bernard Brabin

In this revealing article, Bernard Brabin discusses the extraordinary stories of doctors who risked their lives through self-experimentation to advance medical science. Discover their heroic acts, groundbreaking discoveries, and the stamps that commemorate their incredible contributions to history.

The physician and philosopher Empedocles (492-432 BC), a self-styled god, is said to have died after flinging himself into a volcanic crater atop Mount Etna (*Fig 1*). Wanting to prove his divinity by conquering illness and nature, he may have been the first physician to self-challenge. Doctors who self-challenge purposefully expose themselves to danger. Some, as outlined below, expose themselves to infections in their quest to establish whether an illness is contagious or not. Such physicians are well represented philatelically for their actions have often been heroic.

What are germs?

Before the mid-19th century medical doctors largely interpreted illnesses based on mistaken theories of disease and the idea that germs could be passed between people was not recognised. Treatments, such as bloodletting, had been practiced for centuries to relieve fever, as shown in this Greek issue depicting its use in an Asklepios in *Figure 2*.

Prior to the establishment of germ theory, dozens of doctors self-challenged themselves, but as the basis of their experiments was often misguided and guided by their desire to improve the care of individuals, their work is not philatelically celebrated. The first breakthrough came from the public health concern to control epidemics. There were opposing views as to whether illness was contagious. If it was, using quarantine to control epidemic diseases like cholera and plague would be useful.



Fig 1 Mount Etna is illustrated here on this Italian Europa with CEPT emblem stamp from 1997



Fig 2 A stamp issued by Greece in 1977 for International Rheumatism Year showing bloodletting in an ancient clinic



Fig 3 The East Germany stamp issue from 1968 commemorating the 150th birth anniversary of Max von Pettenkofer. He swallowed infected broth containing cholera to try to prove his theory that the germ alone was not sufficient to cause serious disease



Fig 4 This first day cover was issued by Australia in 2008 to commemorate the centenary of the Quarantine Act in Australia

Trying to prove contagion by doing self-experiments was a plausible way to test this, using material from affected patients. Several doctors died in the 19th century from purposeful exposures to cholera and plague, but largely for economic reasons, the United Kingdom still opposed cholera quarantine mid-century.

Proving that germs can spread

A notable controversy was sparked between Robert Koch (1843-1910) (who in 1892 discovered the cause of tuberculosis) and Max von Pettenkofer (1818-1901) on

whether quarantine should be used in cholera outbreaks. Pettenkofer swallowed infected broth culture containing cholera bacilli to demonstrate (in opposition to Koch) his view that the bacillus alone was insufficient to cause serious disease. Pettenkofer's reputation, after a lifetime of public health service, was at stake, and his experiment was literally a life-or-death attempt to prove his own theory. If fatal, Pettenkofer stated, 'he would be dying in the service of science, like a soldier in the field of honour'.

Although a re-appraisal of Pettenkofer's theory has since partly validated his approach, he has been commemorated with only a single stamp in 1968, with a 150th birth anniversary issue from a celebrity series from East Germany (Fig 3). It was around 1900, when he died, that quarantine became generally approved. Australia commemorated 100 years since its introduction with an issue in 2008 (Fig 4).

The Scottish physician, Joseph Lister (1827-1912), worked tirelessly to understand germs, including corresponding with Louis Pasteur (1822-1895) on so-called 'germ theory'. Lister was alerted by the success of surgeons using antiseptic techniques in reducing wound infection following amputation, which contrasted markedly to the very high mortality (76 per cent) for similar operations without antiseptic surgery during the 1870 Franco-Prussian war (Fig 5).

The Norwegian physician, Gerhard Armauer Hansen (1841-1912), discovered the causative organism for leprosy in 1873. Hansen wanted to disprove the disease was hereditary by trying unsuccessfully to infect himself with leprosy tissue. His work became controversial when he tried this also on non-consenting individuals. In consequence, he was deprived of his hospital post but allowed to retain his role as chief medical officer for leprosy in Norway. Norway released a centenary commemorative issue of two portrait stamps (Fig 6). Many other countries have issued Hansen portrait stamps which include microscopic pictures of the leprosy bacteria.

Daniel Carrion (1857-1885), a Peruvian medical student, died endeavouring to prove Oroya fever was infectious by inoculating himself with tissue from a patient with the condition.

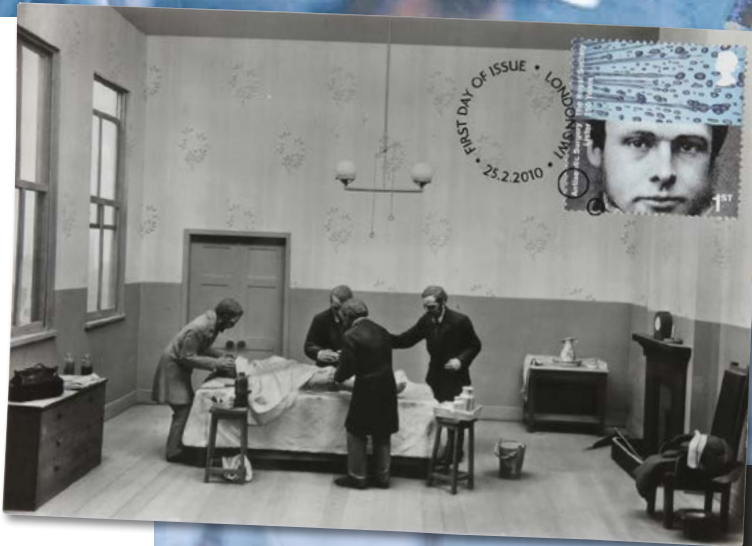


Fig 5 A Great Britain 2010 maxim card with a portrait stamp of Joseph Lister commemorating the 350th anniversary of The Royal Society. It shows a surgical operation using Lister's carbolic spray. Alongside are two stamps from Great Britain's 1963 Lister centenary issue

All covers shown reduced



Fig 6 Two stamps from Norway issued in 1973 to commemorate the centenary of Hansen's identification of the leprosy bacillus. The 1k. value shows his original drawing of the disease while the 1k.40 stamp depicts it as seen with a modern microscope

Hansen wanted to disprove the disease was hereditary by trying unsuccessfully to infect himself with leprosy tissue. His work became controversial when he tried this also on non-consenting individuals



Fig 7 Stamps from Peru from 1958 and 1985 commemorating Daniel Carrion's death and birth centenaries, as well as the 2004 and 2007 commemorative issues

Now named as Carrion's disease, he is celebrated in Peru as a national hero. This is acknowledge by the release of four portrait stamp issues in 1958, 1985, 2004 and 2007 (Fig 7). He has not received philatelic recognition outside of Peru.

About the same time in France, the Russian Elie Metchnikoff (1845-1916), one of the world's great biologists, made a near suicidal self-challenge attempt in 1880

using blood from a patient with another infection, relapsing fever, and remarkably survived following a severe illness.

Metchnikoff stamp issues were from Russia, 1945, 1963 and 1991 (Fig 8), France (1966), Sweden (1968), Ukraine and Moldova (2015).

Proving that bacteria can be controlled

By 1890 bacteria – which are different from viruses and parasites, were identified as the causes of 14 diseases. Lord Joseph Lister, who later became president of the UK Royal Society, characterised Waldemar Haffkine (1860-1930) as an honourable man after he was criticised for testing his plague and cholera vaccines, which he first tested on himself. Haffkine's successes against cholera and plague opened the door to wider acceptance of vaccines. His work is commemorated on a 1964 stamp from India where he carried out plague vaccine trials at the turn of the 19th century during widespread plague epidemics in India (Fig 9).

Another notable physician, Alexander Yersin, (1863-1943), in 1894 was sent to Hong Kong by the French Colonial Office to investigate the plague. Both he, and a Japanese investigator named Kitasato, independently discovered the cause of plague, but the name of the causative organism is named only after Yersin.

Indochina produced a series of three commemorative stamps to honour Yersin, issued at different times between October 1943 and December 1944. Subsequently, Vietnam released a joint issue with France in 2013 in two denominations to commemorate the 150th year of his birth (Fig 10). There was also an earlier 1987 French celebrity issue on Yersin. In 2003 Japan issued a 150th birth anniversary issue for Kitasato (Fig 11).

Robert Koch never self-challenged himself with any infectious agent yet has enormous philatelic provenance. Famously, his identification of the cause of tuberculosis in 1882 was commemorated in many countries with portrait stamp issues. Germany issued the first in 1944, with later centenary issues from both West and East Germany, the latter showing Koch's original scientific paper. West Berlin commemorated his 50th death anniversary in 1960, and a re-united Germany the centenary of his Nobel Prize for Medicine and Physiology in 2005 (Fig 12). These five German stamps issued in the celebration of Koch's achievements unite divisions across this country with a common theme – the discovery and elucidation of the dangers of bacteria.

Lord Joseph Lister's experimental and practical work, which led to the introduction of asepsis into surgical practice



Fig 8 Stamp issues from Russia (1945, 1963 and 1991), France (1966), Sweden (1968) and Ukraine (2015) commemorating the biologist Elie Metchnikoff



Fig 9 India celebrated the work of Waldemar Haffkine and his plague vaccine trials with this stamp issued in 1964



Fig 10 Vietnam and France issued a joint issue in 2013 commemorating Alexandre Yersin's 150th birth anniversary (French issue shown)

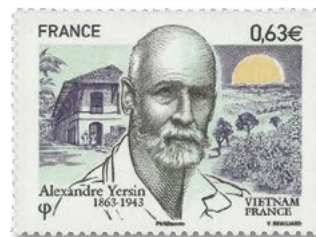


Fig 11 The 150th birth anniversary of Kitasato was celebrated by Japan with this issue in 2003

in the late 19th century, was seminal in saving millions of lives. The practice of asepsis is rarely depicted in postage stamps. Exceptions are the UK 1965 issue celebrating Lister's discovery of antiseptic surgery, and a 1957 French issue depicting Octave Simon Terrillon (1844 - 1895), a French physician and surgeon, known as a pioneer of aseptic surgery. Somewhere around 1882 he advocated the procedure of using boiling water and a heat sterilisation technique for disinfecting surgical instruments, and included on the stamp issue were images of a microscope, an autoclave and some surgical instruments (Fig 13).

The 2018 Ignac Semmelweis (1818-1865) bicentenary issue from Hungary aptly depicts the relevance of hand washing which drove infection control, without which many of the tremendous advances in 20th century surgical and medical techniques would have been impossible (Fig 14).

Infection via parasites

The visibility of some parasites led to work on their transmission and control. The first self-experiment with a parasite was with a gut worm (hookworm) and was conducted in 1878 by the Italian Giovanni Grassi (1854-1925) but it did not induce infection. He conducted further self-experiments the following year with a different worm, and again in 1896 and 1900. He also exposed himself to mosquitoes, which were thought to be carrying the malaria parasite. Fortunately, he remained uninfected. Italy is the only country to have issued a commemorative stamp portraying Grassi (Fig 15).

He later became embroiled in a controversy with Ronald Ross over who had discovered how malaria was transmitted. But it was Ross who received the Nobel prize. Many other doctors deliberately exposed themselves to various tropical parasites but, other than



Fig 12 A German stamp from 1944 with a portrait of Robert Koch, and later East German centenary issue (1982) showing the scientific paper of his discovery of the tubercle bacillus; other issues from 1960 (West Berlin), 1982 and 2005 are also shown

Grassi, there are no commemorative stamps – possibly because many worked mostly in isolation.

Separating viruses as causes of disease as distinct from bacteria and parasites also saw notable self-challenges. One of the most tragic examples was that of the nurse Clara Maass (1876-1901). She was one of two clinical investigators who died participating in yellow fever experiments in Cuba in 1901.

Yellow fever is a virus transmitted by mosquitoes, but their role in transmission was questioned because some volunteers remained healthy after exposure to their bites. Maass, the only female medic known to have self-experimented with infection, volunteered to be repeatedly bitten by mosquitoes that had fed on yellow fever patients. Maass considered contracting yellow fever would improve her understanding of this epidemic disease and help her to be a better nurse.

Her death roused public sentiment, and, as Dr William Lazear (1866-1900) had died the previous year following a similar self-experiment, all American yellow fever experiments in Cuba on human beings were stopped. She is commemorated by issues from both Cuba (Fig 16) and the United States (1976). Dr Walter Reed (1851-1902), the American physician eventually credited with the discovery of the mosquito vector of yellow fever transmission, agreed with these self-challenges and promoted them, but avoided doing a self-experiment himself.

Viruses can be effectively controlled by vaccination. The well-known American scientists, Albert Sabin (1906-1993) and Jonas Salk (1914-1995), who developed the first vaccines against the polio virus, self-challenged with their own vaccines without ill effect (Fig 17).

One physician, Hilary Kiprowski (1916-2013), self-challenged four times with three different viral vaccines he developed, including rabies, without ill effect. He has only a single commemorative stamp issued from Poland in 2016 (Fig 18).



Fig 13 This stamp from France, issued in 1957, depicts Octave Terrillon who was a pioneer of aseptic surgery



Fig 14 Hungary issued this birth bicentenary issue for Ignaz Semmelweis in 2018 showing hand washing for infection control



Fig 15 A 1955 first day cover from Italy commemorating Giovanni Grassi who self-experimented with hookworms and mosquitoes to see how they could transfer infection (Reduced)



Fig 16 Stamps from Cuba, 1951 and USA, 1976, depicting Clara Maass who died participating in yellow fever experiments in Cuba in 1901



Fig 17 Self-challenged scientists Albert Sabin and Jonas Salk appeared on stamps from the USA in 2006 commemorating their polio vaccine



Fig 18 Hilary Kiprowski, who self-experimented multiple times, was commemorated on this single stamp from Poland in 2016

Relevance of self-challenge to modern medicine

The value of self-challenge with potentially infectious agents has reduced with the growth of scientific medicine and controlled research, but sometimes still proves useful. In 2005, the Nobel Prize in Physiology and Medicine was awarded to the Australian physician Barry Marshall (1951-) in recognition of his identification of the bacterial cause of peptic ulcers (gastritis). His self-experiment involved swallowing a suspension of a culture of one million bacteria leading to self-limited gastritis and proving its cause. He conducted the experiment in private, without his Institution's knowledge.

The Solomon Islands commemorated this award with a 2013 issue comparing him to Sir Alexander Fleming (1881-1955), who discovered the action of penicillin, but who never, like Marshall, undertook a self-challenge experiment (Fig 19).

Four other doctors who had challenged themselves with infectious agents (and survived), received Nobel Prizes in Physiology and Medicine, all of whom have several commemorative issues: Ronald Ross (1857-1932) in 1902 for his work on malaria transmission; Metchnikoff in 1908 in recognition of his work on immunity; Charles Nicolle (1866-1936) in 1928 for his work on typhus; and Max Theiler (1899-1972) in 1951 for discovery of an effective viral vaccine against yellow fever (Fig 20).

Most recently the value of quarantine actions was highlighted in three of the eight Great Britain NHS heroes stamps issued in 2022 during the COVID pandemic (Fig 21).

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Fig 19 The Solomon Islands commemorated Barry Marshall in 2013 with this miniature sheet comparing him to Alexander Fleming. In 2005 Marshall was awarded the Nobel Prize in Physiology and Medicine for his bacterial cause of peptic ulcers identification



Fig 20 Nobel Prize winners in Physiology and Medicine who self-experimented with infectious agents: Ronald Ross (India, 1997); Elie Metchnikoff (see Figure 8); Charles Nicolle (France 1958); Max Theiler (The Gambia, 1989)



Fig 21 NHS medics wearing face masks to reduce COVID transmission appeared in the Great Britain 2022 heroes stamp issue

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References

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