

SMALLPOX VACCINATION AND OPPOSITION BY ANTI-VACCINATION SOCIETIES IN 19TH CENTURY BRITAIN

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Synopsis

Over the centuries, vaccination has proven to be a highly efficacious and cost-effective means of improving health on an individual and a population level. However, as with many new discoveries, the initial development of the concept and communication of the emerging observations and trends were met with resistance. In general, most children and adults in the world have been vaccinated – the Bacille Calmette-Guérin (BCG) vaccination alone has been administered to 4 billion infants. Yet to this day, there are still sentiments against vaccination efforts that are accentuated in times of doubt, urgency or uncertainty.

The following dissertation provides an introduction to the history and development of vaccination, with particular reference to the smallpox vaccine. Using primary sources from the Reece Collection preserved at the London School of Hygiene & Tropical Medicine (LSHTM), including publications by Dr Edward Jenner owned by the Southampton Anti-Vaccination League (SAVL), the dissertation analyses several reasons behind the opposition of smallpox vaccination by anti-vaccination societies in 19th century Britain and aims to draw certain parallels between sentiments of antivaccination from the past to sentiments of antivaccination in the present day.

Key Words

Smallpox; Cowpox; Variolation; Vaccination; Edward Jenner; National Anti-Vaccination League

Introduction

Vaccination is still a relatively recent medical phenomenon and remains one of the pillars of preventative public health. New vaccines are continuously being researched and pioneered to offer health systems an effective tool to prevent the acquisition and spread of potentially deadly infectious diseases. Yet even to this day, the human immune response to the variola virus, the causative organism of smallpox, remains poorly understood. With fears of bioterrorism growing in the 21st century and efforts being made to protect the public in the event of intentional release of the lethal virus, research is still being carried out on the remaining stores of the eradicated virus.¹ In late 18th century Britain, Edward Jenner (1749 – 1823), physician from Gloucestershire in English countryside, performed landmark studies laying the foundation for the eradication of smallpox, a disease that had plagued humankind to an almost unparalleled extent, and acted as a paradigm shift in the development of vaccinations to the present day. However, as with all new developments in medicine and science,

the observation, formal documentation and subsequent practice of vaccination generated both support and opposition. Several reasons led to a sentiment of mistrust among certain facets of society. With little understanding of the human immune system and the novelty of the Germ Theory of disease, physicians and scientists were wary of the theoretical basis of vaccination, despite similar observations prior to Jenner's made over many years. Instead, debate among healthcare professionals was rife surrounding the role of hygiene and sanitation measures versus vaccination. In addition, certain physicians were reviled for having a vested interest in promoting vaccination. The following dissertation will focus on smallpox vaccination and opposition by anti-vaccination societies in 19th century Britain. As well as introducing the topic of mistrust in vaccination and the parallels drawn to modern day eradication efforts in an attempt to apply lessons of the past to the issues of the present, the work analyses primary sources from the Reece Collection at the London School of Hygiene & Tropical Medicine, including original publications by Jenner owned and annotated by a branch of the National Anti-Vaccination League (NAVL)

Smallpox Vaccination: a concise history

Smallpox was one of most devastating diseases in history, plaguing humanity and claiming hundreds of millions of lives from its suspected emergence in 10,000 BCE until its certified eradication in December 1979.² Whether in princes or in peasants, the disease burden to humans is considered almost unparalleled with a fatality rate as high as 30%.³ For instance, the plague of Antonine at the time of the fall of the Roman Empire (180 CE) was reported to kill between 3.5 million and 7 million persons⁴. The variola virus has no known animal reservoir and the origin of smallpox is unknown, however many believe the virus emerged by zoonosis from one of the many animal viruses from the *Poxviridae* family. Causing an acute and contagious disease, the clinical features of smallpox include fever, headache, malaise, nausea, and severe muscle pain and abdominal pain. Two to three days after the initiation of fever, infection with smallpox causes the formation of lesions, primarily in the mucous membranes of the nose and mouth, ulcerating and releasing viable virus particles in aerosol droplets for transmission from person to person. Further lesions develop into pustules on the trunk, extremities and face leading to scab formation and ultimately in scarring. Termed "pockmarks", these scars disfigured as many as 65-80% of infected individuals and blinded a considerable proportion. To complicate matters further, no treatment for smallpox existed prior to eradication, or exists at present, with clinical care focussing predominantly on symptomatic management.

Records by ancient physicians such as Thucydides in 430 BCE and Rhazes (Abu Bakr Muhammad Ibn Zakariya al-Razi) in 910 CE document the observations that survivors of smallpox infection were protected against future disease.⁵⁻⁶ As these observations accumulated over time and it was noticed that persons acquiring smallpox through, for instance, scratches suffered attenuated clinical manifestations to smallpox infection. This led to variolation: the purposeful inoculation of smallpox material, such as pus or scabs, to unexposed individuals to confer immune protection, primarily administered by the nasal or cutaneous routes. The origins of variolation remain poorly defined, however evidence suggests that it was practiced in China around 1,000 CE⁷ and in India.⁸ Indeed, Dr John Zephaniah Holwell vividly recollects the early development of an understanding of germ theory in the East Indies:

"They lay it down as a principle, that the immediate cause of the smallpox exists in the mortal part of every human and animal form; that the mediate (or second) *acting* cause, which stirs up the first, and throws it into a state of fermentation, is multitudes of imperceptible animalculae floating in the atmosphere; that these are the cause of all epidemical diseases, but more particularly of the small pox." (Holwell, 1767)

Vaccination, on the other hand, is subtly different to variolation and defined as the inoculation of antigenic material to produce immunity to a disease. The antigenic material can refer to a part or the whole of the organism for which protection is sought or even from a related but different organism. Types of vaccine may be in a live attenuated, killed, inactive or subunit forms.⁹ A pupil of the famous

surgeon and anatomist John Hunter (1728 – 1793), Edward Jenner is credited with developing vaccination to smallpox following astute observation and experimentation in 1796 with milkmaids who suffered from cowpox, a virus closely related to smallpox. Jenner noticed, as had others, that milkmaids who had been infected with the less virulent cowpox tended to be protected from the more dangerous smallpox. Soon after communication of the discovery, news travelled fast and stimulated in France, for instance, a campaign establishing vaccination procedures nationwide.¹⁰⁻¹¹ Application of vaccination with cowpox (whose name is derived from the Latin for cow) to confer protection against smallpox ensued, and the technique is considered to have helped save millions worldwide to this day from the potentially severe consequences of infectious diseases. In 1788, Jenner was elected to a Fellow of the Royal Society for studies on the natural history of the cuckoo bird, and from the early 1800s focussed his work on promoting the eradication of smallpox with the Jennerian Institution and the National Vaccine Establishment. Although there is controversy and debate surrounding Jenner's contribution to the actual discovery of smallpox vaccination (it is argued that Benjamin Jesty [1736-1816] performed the first recorded vaccination, inoculating his wife and two sons with cowpox in the mid-1770s), it is clear that his scientific work and communication of his observations was pioneering.¹²⁻¹³

But what characteristics made the eradication of smallpox a reality when other diseases have well-established and effective vaccines? Table 1 highlights the primary biological features favouring eradication of the virus that survives today solely within two high security laboratories in the United States of America (USA) and Russia.

<i>Characteristic</i>	<i>Effect</i>
Severe disease with rash	Straightforward clinical recognition
Rash indicative of infectivity	Identification of transmissible stage
No subclinical cases	Identification of virus source
No animal reservoir	No viral resurgence
No viral vector	No risk of vector resistance
Seasonality	Periods of naturally low transmission
One serotype	Easier vaccine administration
Stable vaccine	No cold chain required logistically

Table 1. Virus characteristics, favouring eradication. Adapted from Stuart-Harris (1984)¹⁴

Pro-vaccination efforts in 19th Century Britain

The Vaccination Act was first introduced in the United Kingdom (UK) in 1840 to provide free vaccination for the poor and forbid the practice of variolation, increasingly considered as dangerous.¹⁵ The Vaccination Act went even further in 1853 making vaccination compulsory for all infants aged less than 3 months and threatened any uncooperative parents with fines and imprisonment. To some, this was an infringement of inviolable civil liberties and one of the most memorable examples of restriction of freedom in the name of public health and health security. To the authorities, it was a justified restriction of an individual's freedom of choice for the protection of the public from unnecessary suffering. Undeterred, the Vaccination Act of 1867 expanded the age bracket for compulsory vaccination from 3 months to 14 years, leading to cumulative penalties for those that would not comply. Cumulative fines meant that defaulters could be repeatedly fined, with the fine increased on each occasion until the original default was rectified. In addition, the post of Vaccination Officer was created for local authorities to oversee and implement the safe practice of vaccination in their area.¹⁶ Vaccination was cost-effective and efficacious and the authorities aimed to uphold its role in outbreak prevention against a terrible disease. Indeed, four subsequent Vaccination Acts were passed between 1867 and 1907 at a time where epidemics were breaking out across Europe, particularly in areas such as Stockholm where vaccination uptake plummeted. However an anti-vaccination sentiment gathered pace and a movement was born questioning the imposition by authorities.

Anti-vaccination efforts in 19th Century Britain

Responding to efforts by government and health professionals to popularise vaccination, a movement grew increasingly dissatisfied with the practice. Riots in resistance of the Vaccination Act were observed across several towns in the UK.¹⁷ Anti-vaccination societies and anti-vaccination journals were established, such as the *Vaccination Inquirer* (1879) and ten years later the *Anti-Vaccinator* (1896)¹⁶. The most prominent anti-vaccination society in 19th and 20th century Britain was the National Anti-Vaccination League (NAVL), founded in 1896. The roots of the NAVL stem from the London Society for the Abolition of Compulsory Vaccination (LSACV), which was founded in 1880 following the death of Mr Richard B. Gibbs, a leading anti-vaccinationist. One of the London society's most prominent members, Mr William Tebb, subsequently established the *Vaccination Inquirer* as a pivotal means of disseminating their message. The movement enjoyed great success and expanded nationally into the NAVL. The output of the NAVL in terms of publications was regular from the late 19th century, with for instance the *Vaccination Tracts* by Young and Wilkinson (1879), up until 1957 with booklets on Bacille Calmette Guérin (BCG) vaccination against tuberculosis (TB).

Indeed, the NAVL was not the only anti-vaccination society or movement in Europe or beyond. Following a landmark congress in Paris in 1880, delegates from Belgium, France, Holland, Prussia, Switzerland, the United Kingdom, the United States and Württemberg met to declare a consensus on their position against compulsory vaccination.¹⁸ Influence in numbers from links with international collaborators assisted the NAVL in their organisational ideology and strategic direction. The activities of the NAVL were successful to a certain extent and their efforts were rewarded in 1885 with a Royal Commission on Vaccination. As a result, cumulative penalties were withdrawn seven years later and a final report issued in 1896. However the practice of vaccination remained despite the introduction of exemption from compulsion for conscientious objectors, for which it was difficult to gain adequate permission. The view of the medical community, echoed by Dr C. R. Drysdale in the British Medical Journal in 1896, maintained:

“As to the argument about the liberty of the subject, this is out of place in the case of children. Children are not free agents, but are always in subjection to parents or guardians. Hence it is an error to say that the compulsory vaccination of children is an attack on individual liberty. We force parents in this century to feed, clothe, and house their children, and lately to see them educated; and surely this entitles the State to demand that children should be protected against such a terrible danger as small-pox contagion is to health and life.”¹⁹

In light of this, what were the views and objectives of the NAVL? The following section will analyse their objectives and the evidence within the primary sources by key members of the NAVL including Alfred Russell Wallace, William Tebb, JT Biggs as well as two copies of Jenner's publications from the late 18th century owned by the Southampton Anti-Vaccination League (SAVL).

Discrediting Edward Jenner

Apart from the desire to abolish compulsory vaccination, the NAVL firstly sought to disprove or discredit Jenner's observations and findings. Members of the SAVL made their opinions clear with annotations rarely seen in copies of ‘*An Inquiry into the Causes and Effects of the Variolae Vaccinae*’ (1798)²⁰ and ‘*Further Observations on the Variolae Vaccinae, or Cow Pox*’ (1799)²¹ by Jenner. In response to Jenner's opening statement from the former book, describing the observation that a person infected with the cowpox renders them “secure from infection with the Small Pox”, an undefined member of the SAVL decries “What Humbug” (Figure 1)!

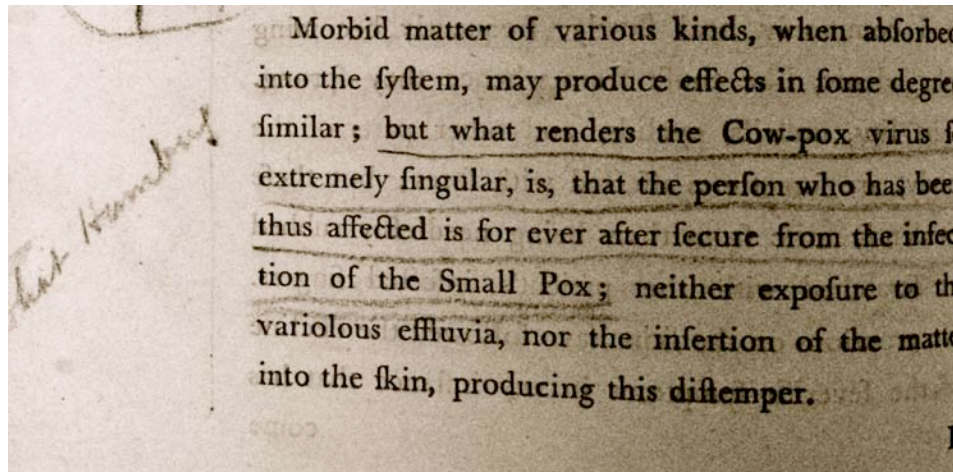


Figure 1. SAVL comment in Jenner (1798), page 6.

The distrust of Jenner's findings is apparent throughout the publication. Even in response to the comments that the SAVL may agree with, oftentimes the reasoning behind such a conclusion is contested. For instance, in reference to Jenner's comment that blacksmiths inoculated with smallpox "either resist the contagion entirely, or have the disease anomalously", the SAVL contested: "if true cannot it be accounted for from the fact that their bodies are in a good state of health from constant [exercise?]" (Figure 2).

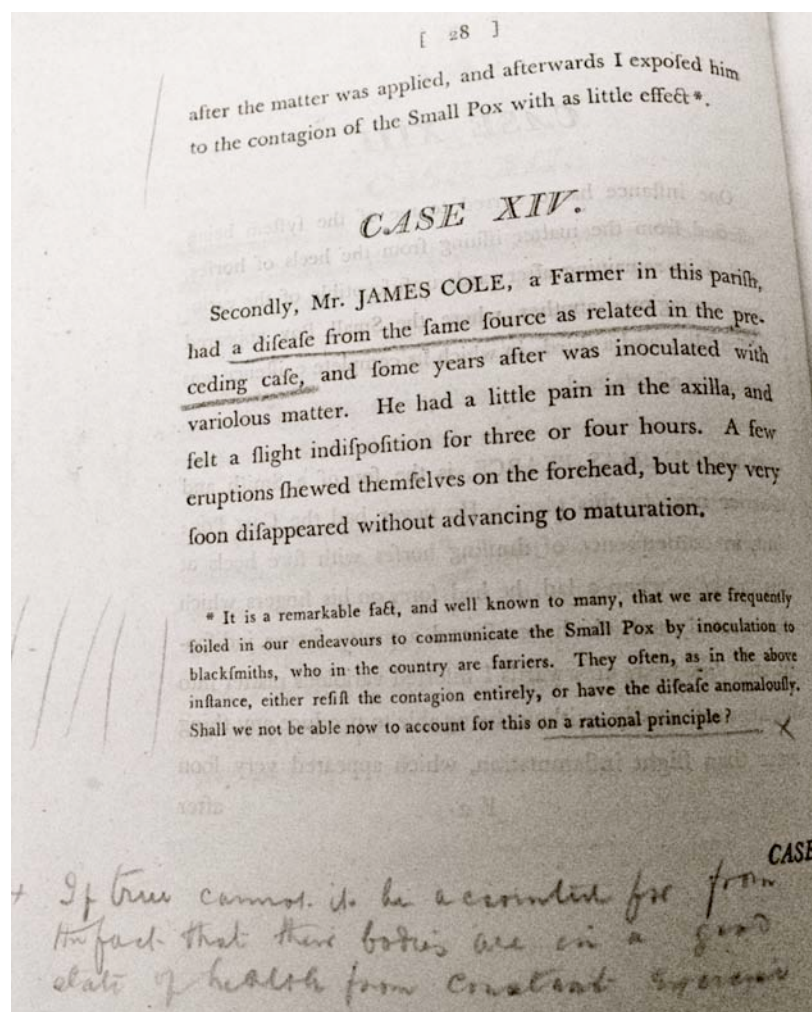


Figure 2. SAVL comment in Jenner (1798), page 28.

However an aspect the SAVL are particularly responsive to is the admission by Jenner of any form of doubt or uncertainty in his methods or observations and their practical meaning. One representative example is an observation concerning horses hooves whereby Jenner admits he has not yet “been able to prove it from actual experiments conducted immediately under my own eye, yet the evidence I have adduced appears sufficient to establish it” (Figure 3).

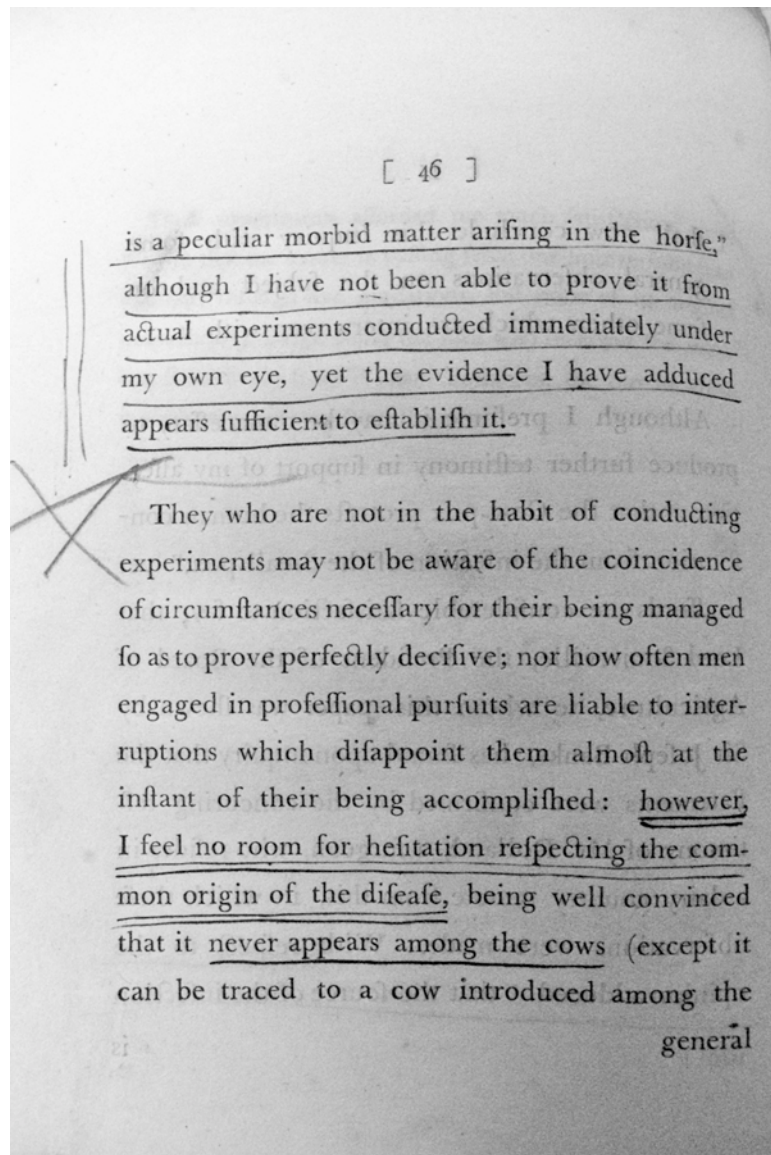


Figure 3. SAVL comment in Jenner (1798), page 46.

The terms “adduce” (Figure 3), “supposing” (Figure 4), and “conjecture” (Figure 5) are only but a few that do not succeed in satisfying or convincing the SAVL. However the SAVL were not alone in their quest to discredit Jenner. Members of the anti-vaccination movement such as Alexander Paul and JT Biggs made their vociferous contributions to the vaccination debate.

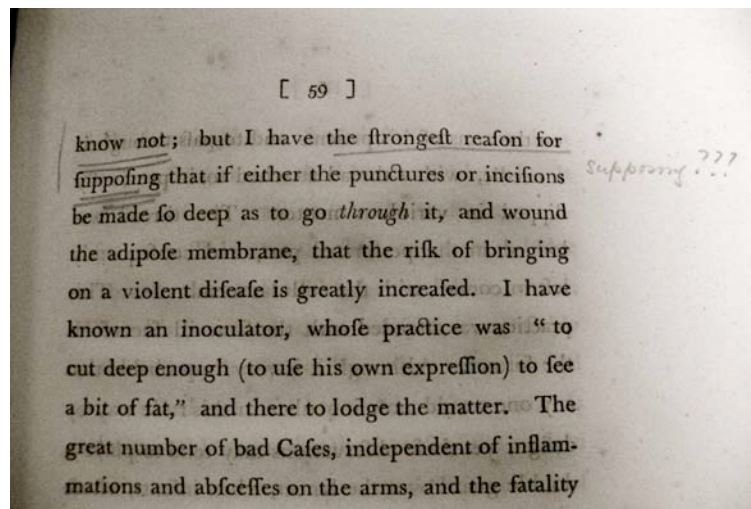


Figure 4. SAVL comment in Jenner (1798), page 59.

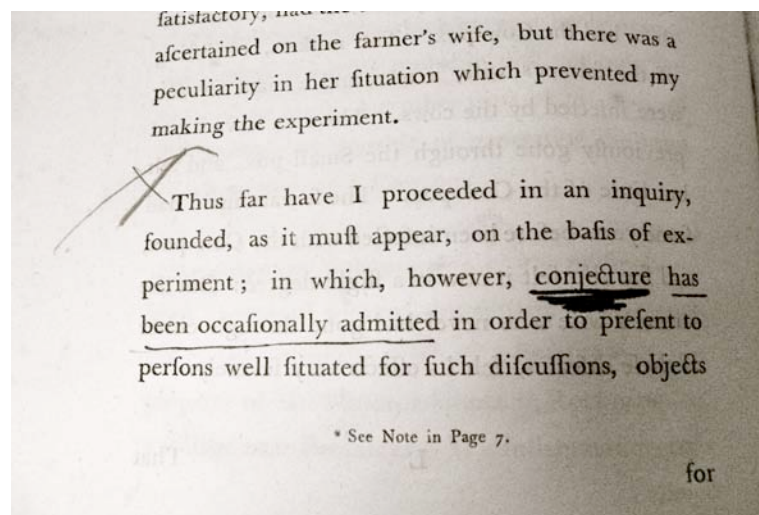


Figure 5. SAVL comment in Jenner (1798), page 74.

Biggs was a prominent campaigner in Leicester, what was to become an anti-vaccination stronghold, and dismissed of the “Protection Theory” conferred by smallpox vaccination as a “loudly-vaunted assertion which secured Jenner £30,000 of the public money – in the shape of two grants from Parliament of £10,000 and £20,000”.²² The vested interests of physicians and politicians alike were central to bringing Jenner into disrepute. Paul on the other hand sought primarily to question the statistics being championed by the pro-vaccinationists by highlighting what he described as the “classification difficulty”, with “false unvaccinated” death rates in babies dying allegedly after vaccination subsequently being classed as “unvaccinated.”²³ Paul advocated that “something septic was introduced”, something unhygienic, leading to the “accidents of vaccination”, linking to the debate surrounding sanitation versus vaccination as the root cause for diminishing cases of smallpox.²⁴

Sanitation versus Vaccination

The SAVL were not convinced of Jenner’s findings that cowpox “leaves the constitution in a state of perfect security from the infection of the Small-pox”. Instead, the SAVL believed that evidence from Jenner’s cases on disease in horses proved “conclusively that sanitary arrangements are the best means to prevent horses from having diseased heels and then does it not follow that cleanliness is more likely to prevent smallpox than introducing filthy matter into the human body” (Figure 6). The notion of hygiene was ingrained in 19th century public health following impressive advances in sanitation engineering and efforts to improve cleanliness across Britain.

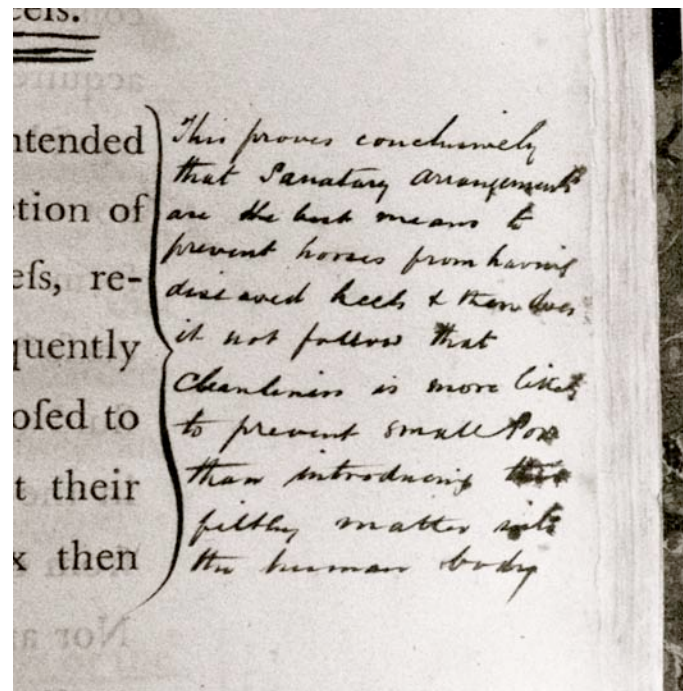


Figure 6. SAVL comment in Jenner (1798), page 47.

Alfred Russell Wallace (1823 – 1913) was a renowned British biologist, naturalist and explorer. A Fellow of the Royal Society (FRS), his theories of evolution due to natural selection influenced Charles Darwin's revolutionary evolutionary theories. A respected scientist, Wallace was not an avid supporter of vaccination at a time when the Germ Theory of disease was still novel²⁵. In his 1898 book entitled '*Vaccination a Delusion: its penal enforcement a crime*', Wallace openly voiced his belief that "much of the evidence adduced for vaccination is worthless."²⁶ Wallace finds support in numbers by listing numerous physicians whose observations of death and disease in post-vaccinated infants contradict Jenner's findings. "Dr. B. Moseley", Dr. William Rowley", "Dr. Squirrel", London surgeon "John Birch", Portsea surgeon "William Goldson", "Dr. Maclean", Musselburgh surgeon "Thomas Brown" are all examples of healthcare professionals involved in the practice of smallpox vaccination from the early 1800s to the late 19th century who, over time, began disputing the suitability of vaccination.²⁷ In particular, Wallace questioned the accuracy of the statistics published on the efficacy of smallpox vaccination, opting in favour of the influence of sanitary measures instead. Disputing facts presented by the National Health Society supported by the Local Government Board in a publication entitled '*Facts concerning Vaccination for Heads of Families*', Wallace disagrees with even some of the basic statements. Referring to vaccination, Wallace states:

"Before its discovery the mortality from smallpox in London was forty times greater than it is now". This is an altogether vague and misleading statement. If it means that in *some* years of the last century it was forty times greater than in *some* years of this century, it is misleading, because even within the last thirty years some years have a mortality not only forty but eighty and even 200 times as great as others (In 1875 there were ten deaths per million, while in 1871 there were 2,420 deaths per million.) If it means on average of say twenty years, it is false. For the twenty years 1869-98 the mortality was about 300 per million, while for the last twenty years before the discovery of small-pox it was about 2,000 per million, or less than *seven* times as much instead of *forty* times!"²⁸

Wallace further criticises the data in *Vital Statistics*, a report by Dr Pierce to the Royal Commission. Referring to the statistics reported in the document, Wallace is adamant that smallpox vaccination is not accountable for a reduction in cases in London (Table 2).

<i>Name of Town</i>	<i>Year</i>	<i>Small-pox Death-rate per Million</i>
Hamburgh [sic]	1871	15,440
Rotterdam	1871	14,280
Cork	1872	9,600
Sunderland	1871	8,650
Stockholm	1874	7,916
Trieste	1872	6,980
Newcastle upon Tyne	1871	5,410
Portsmouth	1872	4,420
Dublin	1872	4,330
Liverpool	1871	3,890
Plymouth	1872	3,000

Table 2. Smallpox death rates in the 1870s across Europe. Adapted from Wallace (1898).

“The small-pox death-rate in the case of the lowest of these towns is very much higher than in London during the same epidemic, and it is quite clear that vaccination can have had nothing to do with this difference. For if it be alleged that vaccination was neglected in Hamburgh and Rotterdam, of which we find no particulars, this cannot be said of Cork, Sunderland and Newcastle.”

In a cathartic and pivotal section of the book, Wallace continues:

“But on the sanitation theory the explanation is simple. Mercantile seaports have grown up along the banks of harbours or tidal rivers whose waters and shores have been polluted by sewage for centuries. They are always densely crowded owing to the value of situations as near as possible to the shipping. Hence there is always a large population living under the worst sanitary conditions, with bad drainage, bad ventilation, abundance of filth and decaying organic matter, and all the conditions favourable to the spread of zymotic diseases and their exceptional fatality.”²⁹

What is most striking about the NAVL is that their arguments are not dismissive without a deeper purpose. Strict scientific and statistical issues guide their discontent, with senior members of the scientific and medical communities supporting the cause to cast doubt on the practice. Naturally, it is straightforward to come to a clear conclusion with hindsight. However the NAVL did not purely focus on discrediting Jenner’s observations or casting doubt on the theories behind vaccination in favour instead of sanitary measures. The NAVL were deeply concerned about fighting against the imposition of compulsion, a move they felt would undermine and limit an individual’s liberty and freedom of choice in an ever-evolving Britain.

Against Compulsion

Is compulsion necessary? This was the question central to Alexander Paul’s argument against smallpox vaccination.³⁰ However, other members of the NAVL went further, likening the law to the inhumane slave trade:

“It has been said of old, that there is no deeper injustice than that which is committed in the name of the law, and it may be added, that with, perhaps, the possible exception of the Fugitive Slave Law of America, there has been no law passed by

any English-speaking Legislature, so unreasonable in its theory, and so hard-hearted in its practice, as the existing Vaccination Law of the British Empire.”³¹

The outcomes of compulsion, in the eyes of NAVL, were disastrous, outweighing the impact of smallpox infection. High rates of paediatric illness were attributed to the vaccine with testimonies explicitly from members of the medical profession:

“Dr. John Scott, Physician to the Manchester Southern Hospital for Diseases of Women and Children, and an ardent vaccinator, in a published lecture, entitled *Small-pox and Vaccination*, says: – “When seeing cases of infants’ diseases, if I ask the question ‘How long has this infant been ill?’ the mother’s answer, as often as not, is ‘Never been right, sir, since it was vaccinated.’”³²

Yet the NAVL kept pushing boundaries, arguing that smallpox vaccination may be responsible for an increase in other diseases (Table 3), for instance stating “the hazardous nature of Vaccination may be estimated by the following”:

Cause of Death	Annual Deaths per Million Living							Increase of Mortality per cent. 1880 over 1850
	<i>1850-4</i>	<i>1855-9</i>	<i>1860-4</i>	<i>1865-9</i>	<i>1870-4</i>	<i>1875-9</i>	<i>1878-80</i>	
Smallpox	279	199	190	147	433	81	40	n/a
Syphilis	37	50	63	82	81	85	84	127%
Cancer	302	327	368	404	442	492	510	70%
Tabes Mesenterica	264	261	272	315	298	330	340	29%
Phlegamon & Pyramid	20	18	23	23	29	39	40	100%
Skin Disease	11	15	15	17	18	23	23	109%
Bronchitis	1,016	1,358	1,658	1,839	2,105	2,464	2,505	144%
Total 6 causes	1,650	2,029	2,399	2,680	2,973	3,433	3,502	112%

Table 3. Mean annual rate of mortality in England from Small-pox, and from six directly or indirectly inoculable causes. Adapted from Tebb 1884.

Conclusion

Describing the anti-vaccination movement in 19th and early 20th century USA, Kaufman concludes:

“With the improvements in medical practice and the popular acceptance of the state and federal government’s role in public health, the anti-vaccinationists slowly faded from view, and the movement collapsed.”³³

Arguably, the British movement against vaccination efforts suffered a similar fate. Yet anti-vaccination in the present day certainly exhibits similarities to yesterday. Despite a growing understanding of the human immune system in protection of the human host against invading pathogens³⁴, there is still no vaccine available for many infectious diseases. The Germ Theory of disease is now well accepted and new challenges exist, such as antimicrobial resistance and emerging infectious diseases. However debate still rages over infection control versus host immunity (either post- or pre-vaccination) paralleling the debates of sanitation versus vaccination. Furthermore, the vested interest of physicians and the pharmaceutical industry in vaccination survives to this day. In fact, this facet has arguably grown exponentially into a powerful lobby and industry capable of

shaping healthcare systems across the globe. Finally, public trust in vaccination can be fickle. This is particularly important as we mount eradication efforts against poliovirus.³⁵ Following controversial work in the UK inaccurately claiming a link between the combined Measles, Mumps and Rubella (MMR) vaccine and autism, originally published in the international medical journal *The Lancet* until retraction³⁶, public trust in vaccines plummeted. Despite the anger of the scientific community against the reputable journal for publishing unfounded claims of great magnitude and against the irresponsibility of the media in their communication of the incident, vaccine coverage in the UK diminished long after clear evidence contradicting the claims was published. Distrust of the MMR vaccine followed a period of time when the UK public distrusted their government over communication of risks concerning bovine spongiform encephalopathy.³⁷ However, with the recent advent of pandemic influenza A H1N1, commonly known as Swine Flu, public trust in MMR has been restored and doubt cast on the Swine Flu vaccination instead, whereas confidence in polio and meningitis vaccination remains high (Professor David Salisbury, UK Department of Health, personal communication). Similar stories are observed across the world, such as in France with doubts over hepatitis B vaccination. Unproven links to multiple sclerosis, autism and leukaemia were the basis of distrust despite repeated support for vaccination by the World Health Organisation (WHO) and French specialists.³⁸ The hepatitis B vaccine distrust followed a period of time when the French public doubted their government over the management of infection-contaminated blood, such as with the human immunodeficiency virus (HIV), in the mid-1980s. These two cases highlight the weight the public give to their perception of the government's competence in advising on vaccination issues.

Overall, the anti-vaccination efforts in 19th century Britain made great progress in advocating their aims and objectives despite their failures in convincing the State. Vaccines are an integral part of today's societies and it is of paramount importance that the public trust evidence-based developments in science, particularly as instruments to securely deal with emerging diseases and epidemics of communicable disease.³⁹ It has been a long journey since Jenner's statement that cowpox "leaves the constitution in a state of perfect security from the infection of the Small-Pox."⁴⁰ However what the anti-vaccination movement highlights is the importance of understanding the other side of the argument for the improvement of health and public safety.

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About the Reece Collection

The Reece Collection is part of the Rare Books Collection at the London School of Hygiene & Tropical Medicine (LSHTM) Library. The physical extent of the Reece Collection consists of 381 books, 53 volumes of press cuttings (dated from 1881 to 1902) and 8 boxes of pamphlets on the subject of smallpox, variolation and vaccination. These were either purchased by LSHTM Library

following the death of Dr Richard James Reece, medical inspector with the Local Government Board in 1925, or donated to the library in 1930 by Dr Hugh Macewen, senior medical officer of the Ministry of Health. The collection contains many works originating from Britain, France, Germany, the Netherlands and Turkey. Crucially, the Reece Collection comprises polemical works about and by Edward Jenner and the NAVL. For the purposes of this paper, the following rare books were studied in depth:

An Inquiry into the Causes and Effects of the Variolae Vaccinae: a disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the name of the Cow Pox by Edward Jenner (1798)

Further Observations on the Variolae Vaccinae, or Cow Pox by Edward Jenner (1799)

Compulsory Vaccination in England: with incidental references to foreign states by William Tebb (1884)

Vaccination a Delusion: its penal enforcement a crime by Alfred Russell Wallace (1898)

Leicester: Sanitation versus Vaccination by John Thomas Biggs (1912)

De la Vaccine, considérée comme Antidote de la Petite Vérole [Concerning the vaccine, considered an antidote to the Small Pox] by L.A. Mongenot (1802)

The Vaccination Problem in 1903 and the Impracticability of Compulsion by Alexander Paul (1903)

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