

Alfred Russel Wallace and the Antivaccination Movement in Victorian England

Co-Discoverer of Natural Selection Soundly Questioned Smallpox Vaccination, Set Historical Parallels for Today

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The [COVID States Program](#) demonstrated ~25% of Americans resisted COVID-19 vaccination. I am constantly being reminded by family, friends, and patients what a relief it was to know declining vaccination was the right medical decision. I wondered if there were any historical parallels.

The smallpox vaccine was variously deployed by doctors in the 19th century using lymphatic fluid from animals or from arm to arm of humans. It could not have been sterilized from bacteria such as staphylococci, streptococci, tetanus, syphilis, or viruses such as hepatitis B. The dose of cowpox virions could not have been measured or controlled. So there were obvious safety concerns such as fatal iatrogenic infections and great debate over whether the procedure worked at all.

In 2010, [Thomas Weber](#) portrayed **Alfred Russel Wallace** in the context of the public sentiment rising against the smallpox immunization campaign in Britain:

“Alfred Russel Wallace, eminent naturalist and co-discoverer of the principle of natural selection, was a major participant in the antivaccination campaigns in late 19th-century England. Wallace combined social reformism and quantitative arguments to undermine

the claims of pro-vaccinationists and had a major impact on the debate. A brief account of Wallace's background, his role in the campaign, and a summary of his quantitative arguments leads to the conclusion that it is unwarranted to portray Victorian antivaccination campaigners in general as irrational and anti-science. Public health policy can benefit from history, but the proper context of the evidence used should always be kept in mind."

HISTORICAL REVIEW

Alfred Russel Wallace and the Antivaccination Movement in Victorian England

Thomas P. Weber

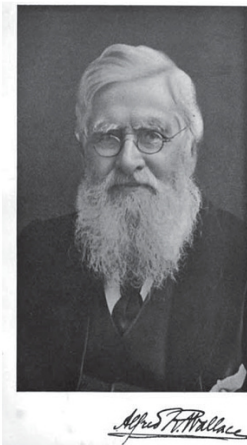


Figure. Alfred Russel Wallace (1823–1913). Perhaps best remembered today in history of science as the codiscoverer of the principle of natural selection, Wallace also played a prominent role in the antivaccination movement in late 19th century England.

who failed to comply. Changes in the law passed in 1867 permitted the authorities to enforce vaccination more efficiently. The law allowed the repeated prosecution of parents who failed to have their child vaccinated. The 1871 Act authorized the appointment of vaccination officers, whose task it was to identify cases of noncompliance. In 1889, in response to widespread public resistance, Parliament appointed a Royal Commission to draft recommendations to reform the system. The Commission published its conclusions in 1896. It suggested allowing conscientious objection, an exemption which passed into law in 1898. In the early 20th century, <200,000 exemptions were granted annually, representing ≈25% of all births (12).

The first vaccination act mainly incited resistance from heterodox medical practitioners who were forced out of business. Large-scale popular resistance began after the 1867 Act with its threat of coercive cumulative penalties. The social and political diversity of the British antivaccination movement is vividly described by Durbach (12). Many of the ≈200 organizations were quite eccentric, even by the standards of the time. However, Durbach's analysis and other analyses (13) show that it is not correct to portray antivaccinationists indiscriminately as antirational, antimodern, and antiscientific. Just considering the details of the vaccination practice of the mid-19th century does much to make many criticisms understandable. For instance, the widespread arm-to-arm vaccination, used until 1898, carried substantial risks, and the instruments used (14) could contribute to severe adverse reactions. Furthermore, many antivaccinationists appealed, like their opponents, to enlightenment values and expertly used quantitative arguments.

inoculation or vaccination. In works such as *Vaccination Proved Useless and Dangerous* (1889) or *Vaccination a Delusion, Its Penal Enforcement a Crime* (1898), Wallace mounted his attack on several claims: 1) that death from smallpox was lower for vaccinated than for unvaccinated populations; 2) that the attack rate was lower for vaccinated populations; and 3) that vaccination alleviates the clinical symptoms of smallpox.

Both provaccinationists and antivaccinationists relied heavily on time series of smallpox mortality rate data, which showed a general decline over the 19th century overlaid by several smaller epidemic peaks and the large pandemic peak of 1870–1873. Their conclusions from these data differed

that could be more helpful in identifying potential causes; did not yet exist. The statistical approach to the vaccinator debate used by Wallace and his opponents could simply not resolve the issue of vaccine efficiency; thus, each side was free to choose the interpretation that suited its needs best. However, despite its indecisive outcome, the debate was a

major step in defining what kind of evidence was needed (17). It is also unjustified to portray the debate as a controversy of science versus antisience because the boundaries between orthodox and heterodox science we are certain of today were far less apparent in the Victorian era (18). What the scope and methods of science were or should be were topics still to be settled. It is thus unwarranted to portray the 19th-century antivaccination campaigners generally as blindly religious, misguided, or irrational cranks. This judgment certainly does not apply to Alfred Russel Wallace.

Wallace was modern, but he represented an alternative version of modernity, a version that has been sidelined in historiography until recently but has lately been acknowledged as a central cultural feature of the late 19th century (19). Movements such as spiritualism were not resurrections of ancient traditions but used interpretations of the most recent natural science, such as experimental psychology, evolutionary biology, and astronomy (20), or electromagnetism (21). Some, like Wallace, also contested the social role that emerging professional sciences should play. Wallace strongly favored a natural science that also addressed moral, political, social, and metaphysical concerns, and with this inclination he ran against the tide that was more concerned with developing a barrier between politics and disinterested, objective science. In the case of vaccination, Wallace argued that liberty and science need to be taken into account, but that liberty is far more important than science. Wallace only appears to have been such a heretical figure if a large portion of the social, political, and intellectual reality of Victorian and Edwardian England is blotted out of the picture.

and economic context between then and now. The Victorian vaccination legislation was part of an unfair, thoroughly class-based, coercive, and disciplinary healthcare and justice system: poor, working-class persons were subjected to the full force of the law while better-off persons were provided with safer vaccines and could easily avoid punishment if they did not comply. The National Health

Weber TP. Alfred Russel Wallace and the antivaccination movement in Victorian England. *Emerg Infect Dis.* 2010 Apr;16(4):664–8. doi: 10.3201/eid1604.090434. PMID: 20350381; PMCID: PMC3321934.

I found this article interesting because:

- 1) Wallace was an eminent scientist,
- 2) he and his family were vaccinated,
- 3) his arguments were based on statistics as described in his work [Vaccination Proved Useless and Dangerous](#) published in 1889,
- 4) by the early 1900's about 25% of the public was refusing smallpox vaccination,
- 5) Weber concludes it was wrong to portray Victorian antivaccination campaigners as "anti-science."

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1889



VACCINATION

Proved Useless & Dangerous

FROM FORTY-FIVE YEARS OF
REGISTRATION STATISTICS.

ALFRED R. WALLACE, LL.D.

Why is the 25% refusal rate the same for both the early unsafe smallpox vaccinations and COVID-19 genetic injections? Why has “anti-science” resurfaced as a term in the context of modern vaccine ideology? Weaponization of the term may give us a clue from vaccine-promoter **Dr. Peter Hotez** who had biodefense grants for COVID-19 vaccines in 2015-16.



THE DEADLY RISE OF ANTI- SCIENCE

A Scientist's Warning

PETER J. HOTEZ, MD, PhD

RBD recombinant protein-based SARS vaccine for biodefense

4R01AI098775-05

Principal Investigator(s)/ Project Leader(s): [HOTEZ, PETER J](#) ; [BOTTAZZI, MARIA ELENA](#) ; [JIANG, SHIBO](#) ;

Organization: BAYLOR COLLEGE OF MEDICINE

Fiscal Year: 2016

Admin IC: NIAID

Funding IC: NIAID

FY Total Cost by IC: \$1,165,855

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RBD recombinant protein-based SARS vaccine for biodefense

5R01AI098775-04

Principal Investigator(s)/ Project Leader(s): [HOTEZ, PETER J](#) ; [BOTTAZZI, MARIA ELENA](#) ; [JIANG, SHIBO](#) ;

Organization: BAYLOR COLLEGE OF MEDICINE

Fiscal Year: 2015

Admin IC: NIAID

Funding IC: NIAID

FY Total Cost by IC: \$1,165,726

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A 2024 paper by [Paul et al](#) obviously calling out Hotez, indicates “anti-science” is a disparaging term used to discredit someone with an opposing view, essentially a device of propaganda. Hotez appears to be using it on offense to defend against his vulnerabilities as a co-conspirator in the US-Chinese creation of SARS-CoV-2 and possibly against a scientific awakening to the risks of the routine childhood vaccine schedule.

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Public Health in Practice

journal homepage: www.sciencedirect.com/journal/public-health-in-practice

Who is “anti-science”?

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ABSTRACT

Objectives: “Anti-science” accusations are common in medicine and public health, sometimes to discredit scientists who hold opposing views. However, there is no such thing as “one science”. Epistemology recognizes that any “science” is sociologically embedded, and therefore contextual and intersubjective. In this paper, we reflect on how “science” needs to adopt various perspectives to give a comprehensive and nuanced understanding of a phenomenon.

Study design: Opinion paper.

Methods: Based on a targeted literature survey, we first clarify the known limits of traditional scientific methods and then reflect on how the scientific reporting about Covid-19 mRNA vaccines has evolved.

Results: The first reports of the Covid-19 mRNA vaccines randomised controlled trial results showed impressive efficacy. Nevertheless, an abundant literature has since depicted a far more nuanced picture of the effectiveness and safety of those vaccines over the medium-term. We organise them around five themes: (i) differentiating between relative and absolute reduction; (ii) taking account of time in reporting effectiveness; (iii) taking account of all outcomes, including adverse effects; (iv) stratifying effectiveness and considering other decision criteria (efficiency, equity, and acceptance); (v) changing the outcome of concern and assessing vaccines’ effectiveness on mortality.

Conclusions: Science offers a wide range of perspectives on a given study object. Only the process of deliberation amongst scientists and other stakeholders can result in accepted new knowledge useful to support decision-making. Unfortunately, by trying to reduce “science” to simple messages set in stone, scientists can become the worse enemies of science.

Paul E, Brown GW, Ridde V, Sturmberg JP. Who is “anti-science”? Public Health Pract (Oxf). 2024 Mar 29;7:100493. doi: 10.1016/j.puhip.2024.100493. PMID: 38601178; PMCID: PMC11004618.

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