

Smallpox in the modern scientific and colonial contexts 1721–1840

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1. Introduction

Maritime voyages in the centuries immediately following Columbus and Vasco da Gama transformed not only Europe's economy but also its mindset. For the first time in history, prosperity depended not on the goodwill of the God or the King but on the initiative of the merchant and the skills of the navigator and the artisan. Huge profits were waiting to be made if ships could sail to distant lands and return home safely. Knowledge lay not in the past but in the future, not in the archives but out in the open. And knowledge meant wealth. When the East India Company was established, the telescope had not yet been invented. It is no more than a coincidence that the invention of the telescope (Van Helden 1977) took place in the Netherlands the same year (1608) the first English ship reached India. This numerology brings home the important point that modern science and technology grew hand in hand with maritime exploration, colonial expansion and domination over nature and fellow human beings. Scientific and industrial activity triggered by oceanic voyages can be discussed under three heads. First, there were efforts to make the voyages safe. Second, activity was triggered in Europe by the arrival of new things, such as vibrantly printed and dyed cotton textiles. This eventually led to the industrial revolution. Third, accumulated knowledge from distant lands was incorporated into the European mainstream.

The best brains of the time applied themselves to furthering maritime activities. Many names, such as Henry Briggs (1561–1636) and Robert Boyle (162–1691), which are celebrated in the history of science, figure in the annals of trading companies as well. With time, feudal forces weakened, mercantile elements gained ground, and Europe in general became receptive to new ideas and influences.

Europeans took great interest in the skills and knowledge of the natives in India and the East in general for the sake of their own survival, out of curiosity and for making an impact back home. Traditional empirical technologies from the East were examined and incorporated into the European mainstream. The process of extraction of metallic zinc by inverse distillation that originated in the Aravalli Hills, India, in ancient times was patented by William Champion in 1738 as Bristol process. Analyses of the samples of Indian carbon steel, wootz, and the process of its making led to advances in European steel technology. Similarly, the metal-cased Mysore rockets used against the British by Haidar Ali and Tipu Sultan served as the starting point for the development of Congreve rockets, which served Britain well in its wars against France and USA.

2. Smallpox

An outstanding example of traditional knowledge from the East leading to major scientific advance in the West is the smallpox vaccination, even though India did not have much of a role in the exercise. Unlike the infectious diseases that affected only the poor, smallpox hit the rich and the poor alike. It killed, blinded or disfigured the aristocrats, felled kings and extinguished royal dynasties. It was the elitist concern that advanced smallpox prevention in Europe. The seventeenth century English medical experts were inclined to view smallpox as an inflammation and (mis)treat it accordingly (Moore 1815 p 217). On the other hand, people in the non-Western world including in China, India, Persia, Arabia, parts of Africa, Turkey and elsewhere did not try to cure smallpox. They made use of the empirical fact that survivors of smallpox would normally not be afflicted by it again. They therefore sought to provide immunity against a

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spontaneous attack through the effective, if somewhat risky, procedure of variolation that is the deliberate introduction of a mild smallpox into a healthy individual, under controlled conditions.

The first intelligence on the Eastern method to reach England came from China. An English trader working in China, Joseph Lister, wrote a letter to Dr Martin Lister (1638–1712) on 5 January 1700 describing how powder from a dried smallpox crust was inhaled like snuff to induce a mild form of the infection. Even before this letter could reach England, Dr Clopton Havers (1657–1702), a bone specialist and a colleague of Dr Lister, independently informed the Royal Society of the Chinese practice, on 14 February 1700 (Behbehani 1983 p 459). It is not recorded who Havers' informant was. There was, however, no immediate follow-up of the lead from China. Rather, it was from the nearby Constantinople that the 'English first derived a competent knowledge of the advantage of inoculation' (Woodville 1796 p 65). Variolation had made a rather late appearance in Turkey, with the first record of its introduction from Anatolia going back no earlier than 1679. In 1712, Dr Edward Tarry of Enfield who had returned after six years' stay in Aleppo and in the Christian localities of Pera and Galata near Constantinople claimed to have observed more than 4000 variolations. There was an immediate institutional follow-up. In late 1712 and early 1713, Richard Waller (1646–1715), the secretary of the Royal Society during 1710–1714, solicited detailed information on the subject from correspondents in foreign countries and in British colonies so that the fellows could be better informed on the subject (Behbehani 1983 p 459).

Independently of the Royal Society, the first detailed professional account of Turkish variolation was prepared by Dr Emanuel Timoni (1665–1741). Born in Greece of Italian parents, Timoni had medical degrees from Padua and Oxford and was elected a fellow of the Royal Society in 1703. At the time he was practicing medicine in Constantinople, where he observed and performed variolation. In 1713, he is believed to have written an unsigned account of variolation, in Latin, on commission from the exiled Swedish King Charles XII, which was sent to Stockholm. Timoni next revised his manuscript, signed it and sent copies to Nuremberg, Leipzig and the French Regent's Council. This work in turn was translated into English and published by the Royal Society in its *Philosophical Transactions* of April–June 1714. This was the first account of variolation published in English. Ever persistent, Waller, on 8 July 1714, wrote to the botanist Dr William Sherard (1659–1728), at the time British Consul at Smyrna (now called Izmir, in Turkey), for more information. Sherard in turn contacted Dr Jacob Pylarini (1659–1718). He was a graduate in law and in medicine from Padua and had served as Venetian Consul in Smyrna and had previously resided in

Constantinople, where he had observed the practice of variolation. Pylarini responded by publishing a Latin pamphlet on the subject from Venice in 1715 and dedicating it to Sherard. This pamphlet was abridged in English for publication by the Royal Society in its *Philosophical Transactions* of January–March 1717. In the meantime, the first popular account of variolation appeared in a book called *An Essay on External Remedies* published in 1715 by the Scottish surgeon Dr Peter Kennedy. His source was Timoni, whom he had met in Constantinople. These technical or semi-technical descriptions, however, failed to enthuse the professional community at large. Lead in the advancement of the cause of inoculation came from lay persons: an aristocrat in England and a clergyman in Boston.

Lady Mary Wortley Montagu (1689–1762) was in Constantinople from 1716 to 1719 in the company of her husband, who was the British Ambassador to the Ottoman Court. Dr Timoni served as physician to the Montagu family and was presumably her adviser also. She got her five-year-old son variolated on 18 March 1718, at Pera, near Constantinople. For the procedure, a Greek woman was sent for, 'who had practis'd this Way a great many Years' (Maitland 1722 p 7). She used a blunt and rusty needle to make incision on the boy's arm following which the embassy surgeon Dr Charles Maitland very self-consciously inoculated the other arm with his own instrument. He now had the satisfaction of giving a modern touch to the old practice. Typically, the embassy chaplain opposed the procedure calling it unchristian that could succeed only in the infidels (Behbehani 1983 p 461).

3. Inoculation in London

The discussion in London so far had been academic. The outbreak of a smallpox epidemic in London in the 1721 spring added a practical dimension to it. In 1721 itself a London-based Portuguese Jewish doctor, Jacob de Castro Sarmiento (1691–1760/61), published his Latin dissertation on variolation. It was translated into German the next year; and a supplement added in 1731. Sarmiento made a significant suggestion. For variolation, the smallpox matter should not be taken from a patient in whom the disease has occurred naturally, but from one who had already been variolated. This second-order induced smallpox would necessarily be milder (Singer 1953 p 1435; Flower 2008 p 9). The British, however, would persist with the riskier arm-to-arm inoculation.

Lady Montagu, since her return to London, commissioned the services of Maitland once again, this time to variolate her three-year-old daughter, in April 1721. This was the first such procedure in England. She would later take her daughter to households with smallpox patients to

demonstrate her daughter's immunity (Behbehani 1983 p 463). Others of her class were impressed, but lacking her boldness, wanted some human experiments to be conducted beforehand. An early convert to the cause was the intelligent and influential Caroline, the Princess of Wales, whose husband ascended the throne in 1727 as George II. On her suggestion, in August 1721, six condemned criminals in the Newgate prison, three women in the age group 19–36 and three men in the age group 19–25, were inoculated on the understanding that if they survived they would be pardoned (Maitland 1722 p 22). Since the procedure was successful, they all escaped hanging. At the suggestion of Dr Richard Mead (1673–1754), later (1727) physician to King George II and Queen Caroline, a seventh condemned prisoner was administered smallpox by the Chinese method, that is, nasally. She also contracted smallpox, recovered and was released (Macmichael 1828 p 69). The human guinea-pig experiments were further extended, on the orders of the Princess of Wales, this time to children. In the later part of March 1722, it was officially reported that a child had been successfully inoculated with matter taken from an inoculated patient, and that five orphans from St James' Parish, Westminster, had successfully undergone the operation. The public was additionally informed where the children could be seen (Miller 1956 p 481). The way was now paved for the much publicized smallpox inoculation, in April 1722, of the King's two granddaughters (Woodville 1796 p 104).

There was widespread awareness, even among the variolationists, that a practice prevalent 'amongst an Illiterate Sort of People' in distant lands was being recommended for persons of high rank (Maitland 1722 p 2). An opponent of variolation, otherwise a well-regarded medical doctor of the time, William Wagstaffe (1685–1712), infamously declared in 1722: 'Posterity perhaps will scarcely be brought to believe that a method practised only by a few *Ignorant Women*, amongst an illiterate and unthinking People should on a sudden, and upon a slender Experience, so far obtain in one of the Politest Nations in the World as to be received into the Royal Palace' (Wagstaffe 1722 pp 5–6; italics in original).

The earliest benefits of variolation went either to the top rung or the lowest rung of British society. In course of time, variolation reached the middle classes. In 1746, a charitable smallpox and inoculation hospital was opened in London. 'For a long time, however, the prejudices against the hospital were so great, that the patients on leaving it were abused and insulted in the street; wherefore they were not suffered to depart until the darkness of the night enabled them to do it unobserved by the populace' (Woodville 1796 p 238). In 1747, Mead, the most eminent physician of the day, published a discourse in Latin on smallpox and measles *De Variolis et Morbillis Liber*, wherein he defended and described variolation. It was translated into English in 1748.

In 1755 the College of Physicians unanimously resolved to give unqualified support to variolation. At about the same time, the rest of Europe also largely woke up to developments in England.

By this time, the first account on variolation in India had arrived in England, probably on Mead's initiative. On 10 February 1731, Robert Coult sent a letter to Dr Oliver Coult in Britain giving 'a short and generall account of the most common Distempers this Part of India is most Infested with, including monsoon fever and dysentery, and a description of the practice of inoculation for the smallpox (variolation), called by the Natives Tikah, [which] has been known in the Kingdom of Bengall as near as I can learn about 150 years' (reproduced in Dharampal 1971 pp 141–142). Oliver Coult was an old India hand. He arrived in India in 1709 as a ship's surgeon and joined the Company's medical service in 1713. He remained in India until 1729. His correspondent, Robert Coult, whose relationship with Oliver Coult is not mentioned, was also a surgeon. He came to India as a surgeon's mate and remained so 'for at least five years, till he was appointed as surgeon in 1738'. He resigned in 1741. Three letters sent out by Oliver Coult have survived. On 25 November 1718, Oliver Coult, writing from Fort William, Calcutta, sent home some comments on how people in Sumatra, Pegu and Siam dealt with fevers. Internal evidence suggests that the letter was sent to Mead (Bancroft 1811 p 59). The second letter was sent in December 1719, while the third is undated. It is surmised that Oliver Coult and then, through him, Robert Coult were informants for Mead. It seems likely that Mead communicated the Coult letters to the Royal Society, and that Thomas Birch (1705–1766), secretary of the Royal Society during 1752–1765, found them among the Society's loose papers and incorporated them into his own collection, now at the British Library. (I thank Dr Arnold Hunt, Curator of Historical Manuscripts, British Library, for his help on the Coult letters.) Mead, however, does not seem to have made use of information supplied by Coult; neither Coult nor Bengal figures in Mead's 1747 book mentioned above.

One would have thought that it would be the British who would be informing European public at large about smallpox inoculation in Bengal, where they had long been entrenched, but that was not so. It was a French Protestant author who published the first details from India, though on hearsay. In 1754, Rev Charles Chais (1701–1786), pastor at a Protestant French church in The Hague, published a tract in French called *Essai Apologetique* in support of smallpox inoculation. Thoughtfully, he asked a friend in Amsterdam for information on India. This friend, identified merely as Mr d'Am..d, was a man of merit who had recently returned after living in Bengal for many years. Curiously, Chais' book was never translated into English, nor was it cited. His

comments on India are as follows, published in English here for the first time (I thank Cecilia Anthony for her help with translation.):

Chais' informer told him that smallpox inoculation had indeed been prevalent in Bengal for a very long time. The variolous matter was preserved in a twisted thread that was inserted into a needle, which in turn was passed between the flesh (*chair*) and skin (*cuir*). Chais' informer knew an English lady, widow of a secretary at Fort William, Calcutta, who had got her two children inoculated. The Bengali inoculator told her that he had some variolous matter preserved from the time of his grandfather or great-grandfather. Chais' friend promised to write by the first mail to Hooghly and elsewhere for more information, which it seems never materialized. Chais' Bengal information was taken note of by the American physician, Dr James Kirkpatrick (1696–1770), in the second edition of his well-regarded book, *An Analysis of Inoculation*, that came out in 1761. In a footnote, Kirkpatrick made a brief reference to the Bengal practice of using twisted silk in inoculation. He also drew attention to the practice of preserving inoculation matter for generations. Noting the inoculation of English children in Calcutta, Dr Kirkpatrick remarked haughtily: 'tho' we give entire Credit to the English Lady, an equal Credit to her Indian Doctor is not a necessary Consequence' (Kirkpatrick 1761 p 213n). Obviously, an English lady's condescending to get her children inoculated was more significant than the skills owned by a native practitioner.

A young Swedish doctor David Schultz (1732–1823), who had earlier been sent out to London for training, published a book in Swedish in 1756 on smallpox inoculation. Schultz is well known for inoculating his King's four children in 1769, for which service he was ennobled as van Schultzenheim. The Schultz book was translated into English in 1758. The British reviewer rather patronizingly felt that while the work would be useful in Sweden where variolation was in its infancy, the English translation would serve no purpose. It was, however, reprinted in 1767 (*Critical Review or Annals of Literature*, London, 1758 Vol 5 pp 386–387, p 386; 1767 Vol 37 p 396). The 1767 English edition, which I have seen, refers to information supplied by 'a Friend of Mr. Chais'. He, however, quotes Kirkpatrick on it. Schulz own comment is: 'People will require a Confirmation before they believe that the people in Bengal, preserve the infected Thread, down from their Grandfathers and Great-grandfather' (Schulz 1767 p 65). The confirmation, it would seem, was never attempted.

In the meantime, in 1765, deciding to follow up on Chais, a fellow French Protestant doctor based in London, Dr Matthews Maty (1718–1776), wrote to his friends settled in Africa and East Indies, asking for details. Maty read his

paper before the Royal Society in April 1768, which published it the same year. Regretting the briefness of his account, Maty informed the audience that in Algeria the preferred procedure was arm-to-arm. Inoculation was unknown in Bihar, but prevalent in Bengal, where 'some variolous matter of the good kind' was gathered and subsequently used in two ways. In the more common and efficacious method, a child's skin was punctured and rubbed with the smallpox matter. Since 'this way of managing the operation is very painful, a more easy one has been invented for people of quality and rank'. Smallpox matter was mixed with sugar, and swallowed by the child in any sweet and pleasant-tasting liquid (Maty 1768pp 130–131; Shoolbred 1805 p 75). Maty's 1768 account is the first notice by the Royal Society of smallpox inoculation in India.

In spite of support from the royalty and aristocracy as well as from within the medical community, smallpox inoculation in England, and Europe in general, faced stiff opposition on theological and medical grounds. Theology apart, engrafting smallpox onto an individual without causing their death or starting an epidemic was not an easy task. No standard procedure existed for it, and there was hardly any difference between a formally trained doctor and a quack. The war on smallpox included the war of the pamphlets. The inoculators had to educate the public as well as themselves. Much to the embarrassment of the English medical establishment, the popularization of smallpox inoculation in England came at the hands of practitioners with dubious ethical standards. Robert Sutton (1707–1777), starting 1757, and especially his son Daniel Sutton (1735–1819), brought about some genuine simplifications in the composite procedure, but combined them with quackish elements to create a secret and expensive package, which they brazenly marketed. As a reaction to their success, attempts were begun towards standardization of the mainstream method. A particularly influential effort was by Thomas Dimsdale (1712–1800), who unlike the Suttons, had a medical degree, from Aberdeen. He brought out a treatise on variolation in 1766 that was translated in various European languages and went into many editions and revisions (see below for the Indian connection). Dimsdale commanded great prestige because in 1768 he inoculated Empress Catherine of Russia and her son and was made a Baron as part of the ample reward.

In 1766, Sir George Baker, physician to Her Majesty's household, published a tract on inoculation. Moved by the 'ill success, which has recently attended Inoculation at Blandford', Baker decided to give the public 'an opportunity of comparing the different result of different management' so that they might decide for themselves 'which method of treating the Small-Pox may seem to deserve the preference'. Baker began his tract by making a sound historical observation: 'How much so ever such a reflection

may mortify the pride of Men of Science, it cannot but be acknowledged that the Art of Medicine has, in several instances, been greatly indebted to Accident; and that some of its most valuable improvements have been received from the hands of Ignorance and Barbarism, This truth is remarkably exemplified – in the practice of Inoculation of the Small-pox; a practice which Chance seems to have first suggested; and of which some poor, unknown, illiterate Woman was probably the original discoverer' (Baker 1766 p 1).

4. India

It was at this stage that the colonial Bengal entered the discourse. Dr John Zephaniah Holwell (1711–1798) gave a detailed, precise and professional account of smallpox inoculation in Bengal in a 40-page pamphlet, published from London in 1767 and inscribed to the president and members of the Royal College of Physicians (Holwell 1767; reprinted in Dharampal 1971 pp 143–163). Holwell was trained as a surgeon and served in Bengal from 1732 to 1760. He was in England at the time of writing the description and was aware how in England the inoculation method 'has been seemingly blundered upon'. He began by mentioning the second-hand reference to Bengal in Schultz' work. Holwell noted that since this work was in a foreign language, 'it may not much benefit my country' (Holwell 1767 p 1). This is curious because as seen above, Schulz had already been translated into English, and Holwell's reference is to the English edition of Schulz's book, as I have checked. It would have been more appropriate for Holwell to point out that Schulz hardly gave any details. It is noteworthy that Holwell chose to ignore Chais altogether, which at the time provided the best information, although in French. With a view to placing the Bengal method in a wider context, Holwell approvingly quoted Baker's above comment, even though he paraphrased it slightly, and identified the author not by name but as a 'learned and judicious ornament of the College of Physicians' (Holwell 1767 p 2). Holwell declared that pricking the pustule with a thorn to take out the liquid was far superior to the use of sharp scissors advocated by Dr Tissot (Holwell 1767 p 39). Holwell strongly recommended the incorporation of 'the cool regimen and free admission of air' into '*regular and universal practice*', pointing out that 'the contrary' had 'proved the bane of millions' in England (Holwell 1767 p 40; italics in the original). Most importantly, Holwell pointed out that severe smallpox occurred in epidemic form, 'Every seventh year, with scarcely any exception'. In the intervening years, the disease did occur but was 'generally so benign as to cause very little alarm' (Holwell 1767 pp 3–4). If smallpox matter from milder years were preserved and used for inoculation, the associated mortality would be low. Whether

the Bengal narrative influenced European practice or not is difficult to say, but Holwell became the sole authority for information on traditional inoculation in India. Later, much would be made of the elaborate ritual that the inoculator attached to the practice. It was not realized that the ritual did not interfere with the empirical procedure and was in fact a way of ensuring that the inoculator's instructions were followed strictly. Since an element of risk was inherent in the procedure, through the ritual every one hoped and prayed that nothing would go wrong during or after the inoculation.

5. North America

Smallpox inoculation was introduced into North America the same time as in Europe, but independently. North America learnt about variolation from Africa rather than the Levant, and that too firsthand. Reverend Cotton Mather (1663–1728), a congregational minister in Boston, was presented with a slave by his parishioners in 1706. The 'Garamantee' slave, whom Mather named Onesimus, gave his master an account of variolation as practiced in his native land and on himself. Mather confirmed the story from other Africans and also learnt that in Guinea the variolated Africans sold for a higher price, and variolation was, in fact, arranged for those would-be slaves who had not received it earlier. Understandably, slaves immune from smallpox were in good demand, because they could attend on smallpox patients in the master's family (Mather 1722 pp 1–2. The small pamphlet itself does not explicitly name Mather.) Mather became the first American-born fellow of the Royal Society of London in 1813, and thus kept himself informed of its deliberations on variolation. When smallpox broke out in Boston in 1721 (more or less at the same time as in London), Mather was ready, but his flock was not. There were severe objections to the introduction of variolation not only from theologians but also from physicians, including the solitary formally trained doctor in Boston, Dr William Douglass (1691–1752), a graduate of Edinburgh University. Mather found support from Dr Zabdiel Boylston (1679–1766), who not only variolated his two slaves but also his own six-year-old son. Boylston, however, was not a degree-holder but a former apprentice. Like in London, it was a cause for comment that 'this wonderful invention' was 'found out, not by the learned Sons of Erudition, but by a mean, coarse, rude sort of People' (Mather 1722 p 5).

Mather in a pamphlet argued for acceptance of the slaves' testimony: 'The more plainly, brokenly, and blunderingly, and like Ideots, they tell their Story, it will be with reasonable Men, but the much more credible' (Mather 1721 p 9). These words appear jarring today, but in his time the Reverend was hoping to convince his constituency not to dismiss African testimony out of hand. Mather and other

supporters of variolation did not meet with much success in introducing the practice among European settlers in America. The American colonies ended up paying a heavy price for their sustained opposition to inoculation, because the British did not baulk at using variolation-induced smallpox as a weapon against them in the American revolutionary wars (Fenn 2001 pp 88–89). If the Continental army had been variolated prior to 1775, Quebec, and possibly whole of Canada, might have been part of USA (Tucker 2002 p 21).

6. Cowpox

Once the concept of immunization had been introduced, it was relatively an easy matter to combine it with what had been common knowledge in rural Europe, that is, cowpox gave immunity from the more virulent smallpox. Systematic investigations were begun by Edward Jenner (1749–1823) when in 1770 he heard a dairymaid categorically tell her doctor that it was not possible for her to have smallpox because she already had had cowpox. The synthesis of Turkey and rural Europe was achieved in 1796 when Jenner successfully inoculated an eight-year-old boy, James Phipps, with material taken from the cowpox lesion of a milkmaid (Behbehani 1983 p 469). Such was the need to convince public at large about the efficacy of vaccination that Phipps who lived to the ripe old age of 80 was variolated 20 times to demonstrate his immunity to smallpox (Behbehani 1983 p 460). The practice of vaccination was begun in London in January 1799 (Shoolbred 1805 p 1). Variolation, however, continued to be practiced at the smallpox hospital in London until 1822. It was altogether stopped by an act of parliament in 1840.

7. Vaccination in India

For some reason, traditional smallpox inoculation prevalent in Bengal and elsewhere in North India did not reach South India, where it was brought in by the British in two stages: first for people under their charge and then among the civil population. Surgeon Nicol Mein variolated 20 European troops in 1787 in Trichinopoly, South India, using the Dimsdale method. The procedure was then introduced for all troops. Next, variolation of half-caste and European boys in the Madras Male Asylum was taken up, which became well established by 1794 (Brimnes 2004 p 202). The British tried to introduce it among the public at large, in 1800, taking the help of local leaders. Inoculations were to be conducted ‘at first according to the practice of the Northern Brahmins and gradually according to the improvements which may be suggested by the medical Gentlemen of the district’ (Brimnes 2004 p 219). The

campaign barely lasted two years because of the introduction of cowpox inoculation.

The vaccine finally arrived in Bombay in 1802 by a largely overland route. Travelling through Vienna, Constantinople and Baghdad, it reached Basra from where it was sent by ship to Bombay. Baghdad onwards, the lymph was carried in succession by inoculated persons (Shoolbred 1805 p 3; Wujastyk 2001 p 139). The first vaccination in India was successfully carried out in Bombay in June 1802 on a three-year-old daughter of a half-caste servant. The doctor was Helenus Scott, who is credited with introducing wootz samples into England. His next 19 vaccination procedures, however, turned out to be unsuccessful (Behbehani 1983 p 478). Vaccination was soon practiced at major places in British India where European children were immediately inoculated. To avoid dependence on ‘the casual zeal of a few individuals’, a regular official vaccination establishment was created in May 1803 (Shoolbred 1805 p 9).

The colonial government now rubbished variolation and launched a campaign for vaccination. As we have seen, introduction of variolation into Britain was not a smooth affair, nor was its replacement by vaccination. The situation in India was far more complex. Variolation was traditionally rooted in parts of it. Furthermore, modernization was being attempted by a foreign government, which the public did not trust, and yet, it wanted Indians to overnight become appreciative of the English ‘spirit of benevolence’ and express gratitude for being conveyed ‘the fruits of the happy discovery’ (Brimnes 2004 p 221). In traditional times, villages were small and mobility was restricted. If everybody in the village got inoculated, there would not be any possibility of an epidemic. Subsequently, when inoculation was carried out on a small number of people in a big city like Calcutta, the risk to the non-inoculated was real.

It was officially noted in 1805 that vaccination was opposed by ‘Bramin inoculators’, who it was said, were now not so moderate as they were in Holwell’s time, especially in and around Calcutta. These practitioners every year inoculated a handful of people who could pay them. These patients were surrounded by a large number of people who were either too poor to pay or refused to get inoculated. Inoculation would ‘thus artificially produce an epidemic, which by its frequent recurrence, proves much more destructive to the community than if inoculation had been entirely abolished, and the casual disease, left to the chance of appearing at the distant periods above mentioned’. (Shoolbred [1805 p 77] estimated this period to be 10–15 years as against Holwell’s estimate of seven years made half a century previously.)

Continuing in the same vein, Dr William Cameron, Superintendent-General of Vaccination, declared in 1831 that ‘It is indispensable to the interests of humanity that the

practice of [smallpox] Inoculation should now cease, but it is pretty evident that while any pecuniary gain is derivable from Smallpox Inoculation, individuals will be found to practise it; and while any prejudices remain against Vaccination, which it is their interest to keep up and increase, there will be no difficulty in finding subjects to practise upon.’ Cameron was enthusiastically cited 20 years later, in 1850, by the Smallpox Commissioners, who declared his words to be ‘impressive’: ‘We think that he might have truly added that, in a country where practices such as *Suttee* and *Infanticide* were, until lately, deemed justifiable on the score of Religious usage, neither will there be wanting bigots to mislead the ignorant Hindoos, and to prejudice their credulous and simple minds, against whatever may be falsely represented to them as an innovation, or an interference with their religious privileges’ (Report of the Smallpox Commissioners, p 54, Calcutta: Military Orphan Press).

Cameron’s words may have been impressive but original they were not. They were a straight lift from a Report of the Pauper Vaccination in Norwich city for 1812–1813. It will, therefore, be instructive to examine at some length the original context. Norwich city embarked on a plan of persuading the poor to get themselves vaccinated by paying them a cash incentive of half a crown. The plan was quite a success, but it was pointed out on the authority of the 1813 Report of the National Vaccine Establishment that ‘It has been ascertained, that small-pox inoculation is the great means by which the disease is kept in existence’. The Norwich Report continues: ‘London, through its agency, is the great generating focus of variolous infection, whence, as in its late communication to Norwich, it radiates to every part of the empire. While this practice continues, it will be utterly impossible to extinguish small-pox, or to prevent the occasional alarm even of those who have been vaccinated. *It is, therefore, indispensable to the interests of humanity that the practice should cease; but it is pretty evident, while any pecuniary gain attaches to it, individuals will be found to practise it; and while any prejudices remain against vaccination, which it is their obvious interest to keep up and increase, there will be no difficulty in finding subjects to practise upon*’ (Edinburgh Medical and Surgical Journal 1814 Vol 10 pp 120–126, p 124). Italics have been added to facilitate comparison with Cameron’s 1830 quotation. The ‘agents in this mischievous practice’ in Britain were described as ‘incapable of reasoning on the subject, and probably still less capable of any moral discussion’. The only remedy lay ‘in passing a law, imposing a severe penalty on any one, directly or indirectly concerned in the act of variolous inoculation’. Note that when variolation is practiced in London even after vaccination has been introduced, smallpox inoculators are called immoral and mischievous and sought to be

dealt with by a strict law. But when the same phenomenon is observed in Calcutta, memories of suttee and infanticide are revived and the blame placed at the door of Hindu bigotry, prejudice and superstition. If the British in India had followed the Norwich model and offered cash incentive to those opting for vaccination, it is very likely that prejudices against it would have disappeared or at least diminished.

Happily ensconced in a Euro-centric world, a British columnist could declare, in 1758, without fear of contradiction that ‘England may be termed the native country of inoculation’ (*Critical Review or Annals of Literature*, London, Vol 5 pp 386–387, p 386) Half a century later, in 1810, an encyclopaedist, conceded, echoing Sir George Baker, that inoculation ‘was originally received from the hands of ignorance and barbarism’. He went on to gush that ‘happily, our learned countrymen did not measure the value of the practice, by the meanness of its origin, but by its real importance and utility. They became examples for adopting it, they encouraged it, and the rest of the world were determined by the general event of the method’ (James 1810). For a detailed and insightful discussion on the vaccination policy in British India, see Bhattacharya *et al.* (2006).

8. Discussion

In their eighteenth century encounters with India and the East in general, the British displayed genuine interest in, respect for, and desire to benefit and profit from traditional empirical technologies. In the early decades of the nineteenth century, this admiration was replaced by openly expressed disdain. This is understandable. You cannot lord over people you respect.

There is a persistent pattern in Britain’s scientific and industrial discoveries of the early nineteenth century. Once a milestone was reached, details of the steps leading to it were obliterated. Eastern antecedents of scientific discoveries were ignored or belittled and modern science presented as a stand-alone, without any pre-history. England came a long way in the period from the start of variolation in 1721 to its abolition in 1840. The period around the 1830s was important for a number of convergent reasons. Industrial revolution and modern science gave Europe the physical means of subjugating and colonizing most of the world. In the case of the old world, it also gave the ideological justification for the exercise. (No such justification was needed in the case of the new world.) The British became a territorial power in India in 1757 when they acquired a part of the Mughal Empire. In the early days, the British very consciously maintained continuity with the Mughal administration, introducing changes in an incremental manner rather than drastically. This transition phase was brought to

a close in 1835 with the banishment of Persian as the official language and introduction of an English-only administration.

In 1837 a Bengal cavalry officer, Captain James Mackenzie, was asked to report on 'the practicability and probable advantage of establishing permanent steam navigation communication between England and India' through Egypt and Arabia. The immediate fallout of the exercise would be the British annexation of Aden in 1839. In his report, Mackenzie declared: 'It seems to be a law of nature that the civilized nations should conquer and possess the countries in a state of barbarianism and by such means, however unjustifiable it may appear at first, extend the blessings of knowledge, industry and commerce among people hitherto sunk in the most gloomy depths of superstitious ignorance' (Mackenzie 1837 p 490). It is noteworthy that the technological and economic imperatives of steam should be camouflaged behind high-sounding civilizational goals. Also, use of the phrase 'law of nature' in the context of human affairs is significant. It is as if the authorship of the powerful knowledge system of modern science bestowed such cultural and racial superiority on the Europeans as to give them a divine right to rule over others.

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