Indian Journal of Emergency Pediatrics
Volume 2 Number 4, Oct - Dec 2010

Father of immunisation- Edward Jenner

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ABSTRACT

Edward Anthony Jenner (17 May 1749 – 26 January 1823) was an English scientist who studied his natural surroundings in Berkeley, Gloucestershire. Jenner is widely credited as the pioneer of smallpox vaccine, and is sometimes referred to as the **'Father of Immunisation'**. Jenner's works 'have saved more lives than the work of any other man'.

Father of immunisation- Edward Jenner

Edward Jenner was born in Berkeley, Gloucestershire on 17th May 1749. He was the eighth of the nine children born to the vicar of Berkeley, the Reverend Stephen Jenner, and his wife Sarah. Unfortunately, by the time Edward was five years old both of his parents had died and he was left in the care of his older sister, Mary, who was soon to marry the incoming vicar, the Reverend G. C. Black. Edward grew up with a great knowledge and interest in country matters: he collected birds' eggs and visited the shores of the River Severn

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(Received on 16.11.2010, accepted on 25.12.2010)

(only a mile to the west of Berkeley) to collect fossils and anything of interest that might have been washed ashore. He went to school in Wotton-under-Edge and Cirencester. During this time he was inoculated for smallpox, which had a lifelong effect upon his general health.

At the age of 14 he was apprenticed for seven years to Mr Daniel Ludlow, a surgeon of Chipping Sodbury, where he gained most of the experience needed to become a surgeon himself. In 1770 he moved to St. George's Hospital in London, to complete his medical training under the great surgeon and experimentalist John Hunter. Hunter quickly recognised Edward's abilities at dissection and investigation, as well as his understanding of plant and animal anatomy. He remain lifelong friends and correspondents.

In 1772 at the age of 23 Edward Jenner returned to Berkeley and established himself as the local practitioner and surgeon. Although in later years he established medical

practices in London and Cheltenham, Jenner remained essentially a resident of Berkeley.

Jenner faced a vast array of medical problems on a daily basis. Patients would often come to consult at The Chantry, Jenner's home, or he would make home visits on horseback, sometimes riding great distances in bad weather. On one occasion he almost lost his own life when visiting a patient at Kingscote, ten miles from home, during a blizzard. Amazingly, he visited patients over an area of about 400 square miles, from Gloucester in the north to Bristol in the south. His medical practice did not abandon those too poor to pay for treatment. Between 1796 and 1804 Reverend Robert Ferryman, built for him a small thatched hut in the corner of the Chantry garden. In this building on certain

days the poor of the district would be given vaccinations, free of charge.

Jenner was also a practising surgeon. Bloodletting, either by cutting veins or by applying leeches, was a common treatment. He would have been proficient at the rapid amputation - without anaesthetics - of limbs that were gangrenous with infection after injury. Although Jenner's friend Humphry Davy had suggested in 1800 that the gas nitrous oxide could be used to relieve pain, the use of anesthetics did not enter routine medical practice until the 1840s. The operation that Jenner performed most frequently was 'cutting for the stone' - the removal of kidney stones. Tracheotomy (the insertion of an artificial windpipe to relieve obstruction in the throat) had been introduced into surgery in 1730. It was a vital in the relief of the effects of diphtheria. Appendicitis could be diagnosed and corrected surgically after 1736. In routine medicine the value of measuring body temperature was not demonstrated until 1815, although Jenner himself was aware of temperature changes in animals and owned a precious thermometer. His close friend, the great London surgeon John Hunter, had given this to him. The

stethoscope was introduced in 1816, opening the way to a better understanding of the mechanics of the heart and lungs.

On 14 May 1796, Jenner tested his hypothesis by inoculating James Phipps, a young boy of 8 years (the son of Jenner's gardener), with material from the cowpox

blisters of the hand of Sarah Nelmes, a milkmaid who had caught cowpox from a cow called Blossom.

Jenner inoculated Phipps with cowpox pus in both arms on the same day. The inoculation was accomplished by scraping the pus from Nelmes' blisters onto a piece of wood then transferring this to Phipps' arms. This produced a fever and some uneasiness but no great illness. Later, he injected Phipps with variolous material, which would have been the routine attempt to produce immunity at

that time. No disease had followed. Jenner reported that later the boy was again challenged with variolous material and again showed no sign of infection.

Jenner's newly proven technique for protecting people from smallpox did not catch on as he anticipated. One reason was a practical one. Cowpox did not occur widely and doctors who wanted to test the new process had to obtain cowpox matter from Edward Jenner. In an age when infection was not understood, cowpox samples often became contaminated with smallpox itself because

those handling it worked in smallpox hospitals or carried out variolation. This led to claims that cowpox was no safer than smallpox inoculation.

Smallpox is believed to have emerged in human populations about 10,000 BC. Blindness resulting from corneal ulceration and scarring, and limb deformities due to arthritis and osteomyelitis are less common complications, seen in about 2–5% of cases. The disease killed an estimated 400,000 Europeans each year during the 18th century (including five reigning monarchs), and was responsible for a third of all blindness. Of all those infected, 20–60%—and over 80% of infected children—died from the disease. During the 20th century, it is estimated that smallpox was responsible for 300–500 million deaths. In the early 1950s an estimated 50

million cases of smallpox occurred in the world each year.

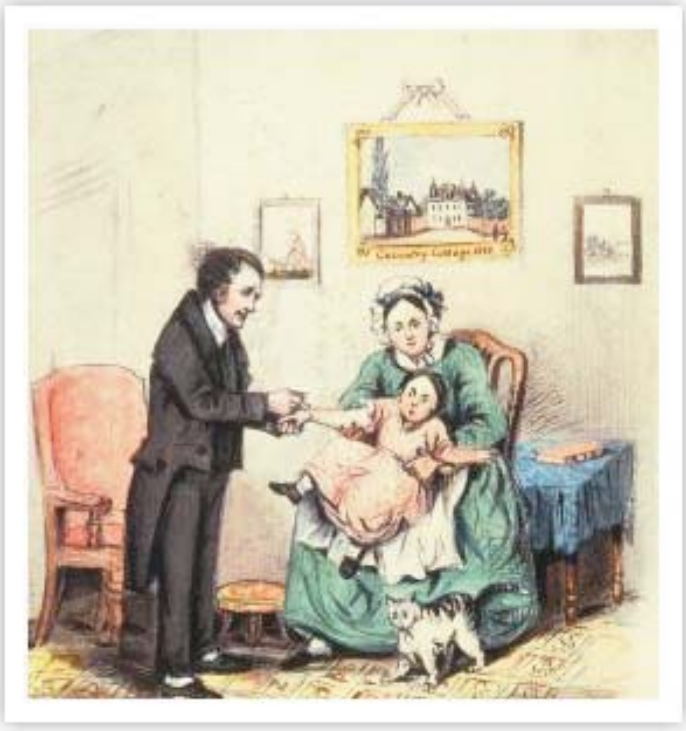
Soon even political cartoonists, such as James Gillray, were publishing engravings that showed people growing cow's heads on their bodies. People became fearful of the possible consequences of receiving material originating from cows and opposed vaccination on religious grounds, saying that they would not be treated with substances originating from God's lowlier creatures.

He continued his research and reported it to the Royal Society, who did not publish the initial report. After improvement and further work, he published a report of twenty-three cases. Some of his conclusions were correct, and some erroneous—modern microbiological and microscopic methods would make this easier to repeat. Variolation was forbidden by Act of Parliament in 1840 and vaccination with cowpox was made compulsory in 1853. This in its turn led to protest marches and

vehement opposition from those who demanded freedom of choice.

Edward Jenner spent much of the rest of his life supplying cowpox material to others around the world and discussing related scientific matters. He was so involved in corresponding about smallpox that he called himself 'the Vaccine Clerk to the World'. He quickly developed techniques for taking matter from human cowpox pocks and drying it onto threads or glass so that it could be widely transported. In recognition of his work and as a recompense for the time it took him away from his general practice the British Government awarded him £10,000 in 1802, and a further £20,000 in 1807. The technique of introducing material under the skin to produce protection against disease became universally known as vaccination, a word derived from the Latin name for the cow (vacca), in Jenner's honour.

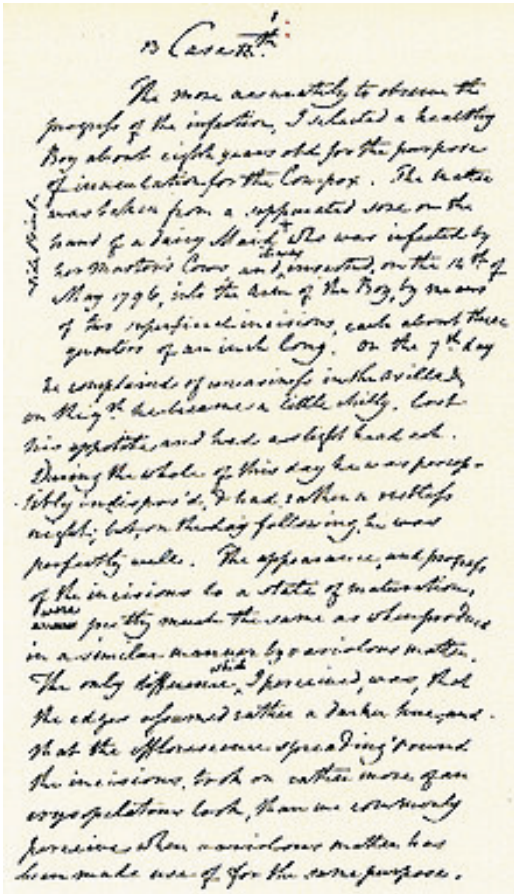
His fame even led to him seeking favours from Napoleon during the war between Britain and France. He successfully negotiated the release of a number of important British prisoners-of-war. Napoleon is reported to have said "Ah, Jenner, I can refuse him nothing". He received the freedom of many cities, including London, Glasgow, Edinburgh and Dublin. Societies and universities around the world gave him honorary degrees and membership. Perhaps the most significant tributes were the minting of a special medal by Napoleon in 1804, the gift of a ring by the Empress of Russia and a string and belt of Wampum beads and a certificate of gratitude from the North American Indian Chiefs. Statues to his honour were erected as far afield as Tokyo and London. The latter is now in Kensington Gardens, but was originally sited in Trafalgar Square.



In 1967 the World Health Organization (WHO) launched its campaign to eradicate smallpox worldwide. They estimated at that time that there were still up to 15 million cases of smallpox each year. The biggest problem areas were South America, Africa and the Indian subcontinent. Their first approach was to vaccinate every person in the areas at risk. Teams of vaccinators from all over the world journeyed to the remotest of communities.

After an anxious period of watching for new cases, in 1980 the WHO formally declared: "Smallpox is Dead!" The most feared disease of all time had been eradicated, fulfilling the prediction that Edward Jenner had made in 1801. It has been estimated that the task he started has led to the saving of more human lives than the work of any other person. The last remaining specimens of the smallpox virus are now held in just two laboratories, in Siberia and the USA. The samples, used for research, are afforded higher security than a nuclear bomb. One day they too will be destroyed. Smallpox will have become the first major infectious disease to be wiped from the face of the Earth. Edward Jenner's Inquiry can be identified as the origin of one of the most important branches of modern medicine. All that is known about disease prevention by vaccination, our understanding of allergy, autoimmune diseases (such as rheumatoid arthritis), transplantation and AIDS follows from this fundamental work by Edward Jenner.

His original report is in the Royal College of Surgeons (London)



these ideas and observations on bird migration. Unfortunately, Jenner never did find the time to write up his studies, but his family published them after his death.

Jenner was awarded that distinction in 1789 for a paper that explained the nesting habits of the cuckoo - a bird that had intrigued philosophers and naturalists since the days of Aristotle. The cuckoo is unique among birds in the way it parasitises other species of birds during the rearing of its young. It lays a single egg in the nest of a bird of another species, most commonly, the hedge sparrow. The foster-parents then feed and raise the young cuckoo as if it were their own. Only the young cuckoo survives. All eggs and fledglings belonging to the birds that built the nest disappear. Jenner determined to find out why only the cuckoo survives in each nest and why its parents adopt this strange way of breeding. After a false start based on some rather careless fieldwork done by his 16-year old nephew Henry, Edward Jenner carried out his own observations and re-wrote the paper he had been on the point of sending to the Royal Society. This revised presentation was submitted at the end of December 1787, accepted, and read to a meeting of the Society on 13 March 1788. Jenner was elected a Fellow on 25 February 1789, in recognition of his contribution.

Edward Jenner's family life was marred by illnesses. He had married Catherine Kingscote in 1788, when he was 39 and she 27. She had borne him three children: Edward (1789), Catherine (1794) and Robert Fitzhardinge (1797). His daughter married but did not produce a grandson for him until after his death. His son Robert remained unmarried. His other son, Edward, died of tuberculosis in 1810, aged 21. His wife, Catherine, had never been strong and her health was a constant worry to her family and friends. Back in 1790 the great John Hunter had written from London enquiring about her condition. On 13

September 1815 she too succumbed to tuberculosis.

To ease his depression he returned to past interests: fossil collecting, his home and his garden received much attention. He had both a kitchen garden and an ornamental area. The latest varieties always attracted him. He imported vegetable seeds from Italy and Spain. He became expert at propagating fruit bushes such as gooseberries, raspberries and figs. In 1818 he introduced young grapevines from the famous stock at Hampton Court. The previous year he had built an extension for them onto his hothouse at the rear of the main house. Nearly two centuries on, those same Black Hamburg vines annually produce fruit for sale to visitors.

On a cold January day in 1823 Jenner was called out to the local coroner, who had suffered a stroke. The following morning when Edward did not appear for breakfast a servant was sent to call him. He was found unconscious in the library. Jenner's nephew Henry bled him several times, without effect, for he never regained consciousness after his stroke. He passed away quietly just after two o'clock on the following morning, 26 January 1823, at He was buried in the family tomb beside the altar in Berkeley Church, next to his parents, eldest son and wife Catherine. The funeral was a very local affair, with no one attending from London.

"While the vaccine discovery was progressive, the joy I felt at the prospect before me of being the instrument destined to take away from the w one of its great calamities, blended with the fond hope of enjoying independence and domestic peace and happiness, was often so excessive that, in pursuing my favorite subject among the meadows, I have sometimes found myself in a kind of reverie. It is pleasant for me to recollect that these reflections always ended in devout acknowledgements to that Being from whom this and all other mercies flow."
—edward jenner

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