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### THE STORY OF SMALLPOX IN MASSACHUSETTS\*

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*Mr. President and Fellow Members:*

IT is a great honor to be asked to stand here as the one hundred and twenty-seventh annual orator of this Society.

Greatly handicapped by the fact that I immediately follow that distinguished writer, orator and surgeon, Dr. Harvey Cushing, it occurs to me that instead of wandering in fields where my somewhat senile mind might easily lead me astray, I had better confine myself to something that I do know a little about and consequently, and I hope not too lengthily, I propose to tell you the story of smallpox in Massachusetts.

It was in Massachusetts that inoculation for smallpox was first tried out on this side of the Atlantic.

Massachusetts was the first state in the Union in which vaccination against smallpox was performed.

The first medical publication in this country was a broadside on the treatment of smallpox published in Boston.

The first state compulsory law for the vaccination of school children was passed by a Massachusetts Legislature.

In proportion to its population, in no state in the Union has less smallpox been of late years annually reported. That this comparative immunity has been attained, despite the fact that the United States as a whole suffers more today from smallpox than any country in the world, bar India, China and possibly Russia, speaks well for its health officers both state and local.

Massachusetts probably knew smallpox before the Mayflower crossed the sea, for when as the Historian Baylies puts it, "on the bleak shores of a barren wilderness with the blasts of winter howling around them, the Pilgrims of Leyden laid at Plymouth the foundations of American liberty", it is more than probable that to the recent extermination of the previous inhabitants by an epidemic that may well have been smallpox those who survived that first winter

owed their preservation. Seven years earlier the Narragansetts alone were said to be able to muster some 3,000 warriors and had but a tithe of that number put in an appearance to repel the invaders, not all the bravery and strategy of Miles Standish and his men could have saved the half-starved remnant of that little band. The attempt to found a settlement at Plymouth would have failed as did the similar effort at Jamestown in 1607. That some terrible calamity had destroyed the inhabitants of Plymouth and the surrounding country is an undoubted fact. The Pilgrims settled in no unknown territory. Whether or no the Norsemen rounding Cape Cod named it Kjarlarnes or buried one of their leaders on the Gurnet at the entrance of Plymouth harbor, whether or no Sebastian Cabot sailed thus far to the south, it is undoubtedly true that the Gosnold Expedition in 1602 gave the name "Cod" to the cape of fishes, that in 1603 the ships of three nations, England, France and Holland, visited the site, that the men with Captain Pring went ashore there and even erected a barricade of logs, and it is more than suspected that here was the Occomock where Capt. John Smith fought with the Indians in 1614. In 1619 Capt. Thomas Derner found "some ancient plantations not long since populous, now utterly void, a remnant remaining but not free of sickness". What was this sickness? For many years ships from Europe had been present in North American waters. Since the discovery of the Hudson by Verrazano in 1524, the French had constantly sailed up that river to trade with the Indians. As early as 1527 there were at St. Johns at one time 14 sail of Normans, British and Portuguese, and 75 years later France, Spain and England had engaged in fishing off that northern coast no less than 450 vessels. In 1609 Champlain was leading his Algonquins against the Iroquois on the lake bearing his name. In 1613 Adrian Block was at New Amsterdam and the next year exploring Long Island Sound. In 1615 a trading post was established where Albany now stands. It seems impossible that, with the then universal prevalence of smallpox, cases were not constantly occurring on these vessels and among these adven-

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turers. It also seems unlikely, contact with the Indians being close (some thirty of them in one instance being taken to Portugal and sold as slaves) that, in the course of time, the disease was not communicated to the aborigines.

Samoset, the Wampanoag, with his, "Welcome, Englishmen", and his invitation to "take the soil", had learned the language from those who came as far south as the Penobscot.

Miles Standish in 1620 found, as did Derner the year before, but "a few straggling inhabitants, burial places, empty wigwams and some skeletons" and whether it came from the ships or spread to New England from the distant south into which it had been brought by Pizarro and Cortez one hundred years before, I submit that neither malaria, nor yellow fever, nor the plague, but smallpox was the blessing in disguise that gave our emigrant ancestors an opportunity to found the state.

Be all this as it may, it was not long before the settlers began their own battle with smallpox. The fight is not yet over, perhaps never will be, although what is happening in our time is but a skirmish against outposts compared with the contest waged by our predecessors. The opposition to our present laws and their improvement would seem but the blowing of a summer zephyr to those who endured the hurricane of abuse hurled against the advocates of inoculation in 1721 and of vaccination in 1800.

For 180 years smallpox was responsible for more deaths than any other one cause. Almost always sporadically present, coming in epidemic form every few years, few indeed escaped its ravages.

There were deaths from it in Boston within a year of its settlement in 1630.

In 1633 it swept away almost every native as far north as the Piscataqua and destroyed some 300 Narragansetts to the south.

In 1636 the General Court moved to Cambridge and later to Roxbury to escape the disease then raging in Boston.

In 1638 Winthrop says that "two ships came in much 'pestered', lost many passengers and some principal men", that, "many fell sick after they landed and again many of these died and many inhabitants with them".

Capt. John Bonner speaks of an epidemic in 1640 and there was certainly an outbreak in 1649.

In 1659 the General Court sat at Charlestown on account of the spread of the smallpox in Boston.

In 1666 forty died of the disease.

In 1668 a fast was appointed on account of its prevalence and the election sermon with its title of "Nehemiah on the Wall in Troublous Times" opened with the declaration that—"The still outstretching hand of God's powerful wrath over this poor country, smiting down our

pillars, plucking up our stakes and taking from us the breath of our nostrils is a matter so doleful, solemnly awful and tremendous that one may well sigh out our sorrows in the words of the lamenting church, Lamentations 5:16:17, 'The crown is fallen from our head: Woe unto us that we have sinned! For this our heart is faint; For these things our eyes are dim.'"

In the winter of 1677-78 smallpox again raged, brought as usual by English ships, and many deaths were recorded. Fast days were held to stay its progress, but the first of Trousseau's three epochs of smallpox was at hand, the other two being of course inoculation with and vaccination against it.

Sydenham, the English Hippocrates, was now to immortalize himself by overturning the practice of centuries in the treatment of fevers and of smallpox in particular. Early in 1666 he published his "Methodus Curandi Febres" treating of the continued, pestilential, intermittent and epidemic forms. A second edition appeared in 1668 and a third much enlarged with a section particularly devoted to smallpox in 1676. No longer was the unfortunate victim to be kept in "a chamber close shut, if it be winter the air to be corrected by large fires", care taken that "no cold air" got to his bed, where he lay covered with blankets, his linen never shifted till after the fourteenth day for fear of "striking in the poek to his irrevocable ruin"; he comforted the while by the assurance of the authority Diemerbröck that "it is far better to let the patient bear the stench than thus to be the cause of his own death". For all this was to be substituted as Sydenham's influence spread, despite the abuse of his contemporaries, rest in bed, plenty of air, moderate heat, and light but sufficient covering, cool drinks, and marked dependence on the *Vis Medicinæ Naturæ* with a following on the physician's part of the Hippocratic practice of watching and aiding the natural crises instead of trying by active and intrusive measures to force the issue. With but little delay the proposed change in treatment was brought to the attention of the people of Massachusetts, for on January 21, 1677 there appeared as a broadside—

#### "A Brief Rule

To Guide the Common People of New England  
How to Order Themselves and Theirs in the  
Smallpocks or Measles

This was printed by John Foster of Boston and signed by Thomas Thatcher, the first minister of the Old South Church. Smallpox was then again present in epidemic form for the ninth time in 47 years. Without question Thatcher was familiar with Sydenham's publication of the previous year. The use of words and the construction of sentences betray the broadside's origin. We are told of the "boiling of the

blood by which nature thrusts out the impurities from veins to flesh and from flesh to skin” and are warned of “the danger of overhastening or overdelaying this process either by too many clothes, too hot rooms, cordials like Diascordium, Gascon’s powder and such like, or by preposterous cooling by bloodletting, glysters, vomits, purges or cooling medicines, lest by the first treatment come phrenzies, dangerous sweats or flowing of the pocks together, or by the latter means there be raked away that supply of blood which should keep them out until they are ripe.” “Let him drink,” says Thatcher, “small beer warmed with a ‘tost’, sup up water gruel made with indian-flour not with oatmeal: let him eat boiled apples but (and mark the words) I would not advise any medicines. But if his blood be enraged that it will admit of no delay, bleed him. These things have I written”, he continues, “not to inform the learned physicians that have much more cause to understand all that pertains to the disease than I, but to give some light to those that have not such advantages. I am though no physician but a well-wisher to the sick and therefore entreating the Lord to turn our hearts and stay His hand.”

“I am

A Friend, Reader,  
to thy Welfare.

Thomas Thatcher.”

Despite his disclaimer Thatcher was, as Dr. Viets has pointed out, one of the outstanding preacher physicians of the time. He had studied with Charles Chauncy, later the second President of Harvard College, who also combined the care of bodies with that of souls and he himself died the next year following a visit to a sick person. This combination of medicine and theology was as common in the mother country as on this side of the Atlantic and had existed from very early times. Medicine was not a distinct profession but was practised by the clergy, even by those holding exalted positions. The Bishop of Worcester was for example the physician to Richard the II. Physician or no, Thomas Thatcher by his publication paved the way for a more humane treatment of smallpox in the Colony and Sydenham’s methods became known here through his broadside almost as soon as they attracted any marked attention in the mother country. Though the treatment became more humane, though lives were undoubtedly saved, the ravages of smallpox ceased not at all.

In 1690 the disease which had prevailed in Boston before the departure of Sir William Phips’ ill-fated expedition against Canada spread through the fleet and many died both during the advance and the retreat, while many more perished on shore after its return. Public fasts were decreed in March and in July

but it was not until February 23, 1692-3 that a thanksgiving was held for the cessation of the scourge.

In 1697 smallpox again held sway, carrying off in that and the succeeding year some ten hundred of the then seven or eight thousand inhabitants of Boston. Visualize, if you can, what the death of 250,000 of the 2,000,000 people in Metropolitan Boston of one disease in one year would mean to us, and you picture what our ancestors endured during those twelve months with what courage they might. Three years later, in 1700, Mr. Leverett writes that Judge Sewall came from Cambridge to open the Court in the Meeting House, “because the Town House is very near a house that has the smallpox and people are afraid to go there”. May I add, as well they might be?

In 1701 the first smallpox prevention act authorized the impressment of houses for the isolation of patients.

In 1702 three hundred died, the tolling of bells at funerals was limited, “there to be only a first and a second tolling, each bell not to exceed the space of half of one quarter of an hour” and it was suggested that there be moderation in the price of coffins, digging of graves and wages of porters to carry the corpse, but the unhappy constable was still required to fulfill that duty of his office which compelled him “to attend the funerals of those dying of the smallpox” and to walk before the corpse to give notice to “any y’t may be in danger of ye infection”.

And then for 19 years Massachusetts was practically free from the disease, by far the longest period of immunity since the landing at Plymouth. A whole generation that knew it not had grown up when in 1721 in the midst of the most terrible outbreak up to that time recorded inoculation was introduced.

The first hundred years had come and gone. Twelve times present in epidemic form, sporadic cases always cropping up, the only escape flight and that too rarely a successful expedient, smallpox during this century had done more to hinder the growth of the Colony than Indian raids, foreign wars or any other general calamity.

A letter describing inoculation as practised in Turkey sent to Dr. John Woodward of London in 1713 by Dr. Emanuel Timonius Alspeck of Constantinople and a second letter from Pylarinus, a Venetian physician on the same subject were published in the *Philosophical Transactions* of the Royal Society in 1714 and 1715. Little attention seems to have been paid to these publications in England. It was not so when they reached America, as will be seen in the sequel. Lady Mary Wortley Montagu, wife of the English Ambassador to Turkey, described the practise in a letter to a friend in

1716, had her son inoculated soon afterwards, and in 1718 returned to England determined to do what she could to bring what she calls "this useful convention" into fashion. She later protested that for four or five years after her return she scarcely passed a day without repenting her audacity. If she followed up what she wrote to her friend in 1716, she told all and sundry that smallpox so fatal in England was entirely harmless in Turkey, that old women operated every autumn on parties of people who decided to have the disease together (these parties were common in New England later in the century), that patients were rarely in bed more than 2 or 3 days, never had more than 20 or 30 pocks on their faces and no scars, and that there was no example of one who had died of it, but it was not until April 1721, three years after her return to her home, that under the protection of the Princess of Wales, later Queen Charlotte, she arranged the first inoculation in England that of her own child, little Mary Alice. Clamor rose beyond belief. The clergy thundered from the pulpit on the impiety of thus seeking to take events out of the hands of the Almighty, Edmund Massy of St. Albans, for example, preaching against sinfully endeavoring to alter the course of nature by presumptuous interposition which he would leave to the atheist, the scoffer, the heathen and the unbeliever, and concluding that Satan was the first inoculator quoted Job 2:7, "So went Satan forth from the presence of the Lord and smote Job with sore boils from the sole of his foot unto his crown." The common people hooted at Lady Mary in the streets as an unnatural mother; "Four great physicians were", she says in her memoirs, "deputed to watch the progress of the experiment with an evident unwillingness to have it succeed, manifesting such a spirit of rancour and malignity that I never dared to leave the child with them for one second lest it should in some secret way suffer from their interference." Her opinion of the English medical profession was not exalted for she "would have written from Turkey to some of them", as she puts it, "if I knew any that I thought had virtue enough to destroy such a considerable branch of their revenue for the good of mankind."

Remembering the high mortality of smallpox, responsible as it was for 1/10 at least of all deaths, one cannot perhaps wonder at the feeling exhibited against one who was deliberately and in the popular opinion unnecessarily aiding in its spread.

When, however, we realize that inoculation had been practised in India from time immemorial and in China for hundreds of years where inoculation in the nostrils was the usual practise—the right side being used for males, the left for females—it does seem rather remarkable that it was unknown in England and

indeed in Europe generally 40 years after it had been practised in Turkey and it comes to us with rather of a shock to read in the court records of 1710, but 11 years before Lady Mary's experiment, that one, Thomas Hawkins, "was paid 8d. for whipping two people who had ye smallpox", whether as a cure or a punishment does not appear.

The Royal Society's publications containing the Timonius & Pylarinus letters were brought to Boston in 1718 by the Scotch physician, William Douglas, who had studied medicine in Paris and London and was to be for many years the only graduate in medicine in the Colony. These publications he, a man of ability and intelligence and a masterful writer but tactless, with strong prejudices and a craving for notoriety and as someone said of him "always positive and sometimes accurate", lent, probably early in 1721, to one whom in a letter to a friend he calls "a vain, credulous preacher". This preacher was the famous Cotton Mather, himself an occasional contributor to the Transactions, who to the indignation of Dr. Douglas almost at once made use of them.

While little Lady Mary still lay ill in London, the British fleet from the Barbados brought smallpox again to Boston where it spread, even for those times, with unexampled rapidity. Before it subsided, a year later, 5,759 of the 12,000 inhabitants of Boston had been stricken, 844 of whom died, while the surrounding towns and very likely those more distant were in equally bad case. Roxbury, Cambridge and Charlestown were particularly affected, 100 dying in the latter small settlement alone, and so many were ill that by Christmas the selectmen ordered that the sexton do not on any account whatsoever, without an order from them, toll above three bells in one day for the burial of any person, lest it be a discouragement to those that were ill with the smallpox. The prosperity if not the very existence of the Colony was most seriously threatened. Mather fresh from his reading and mindful of the fact that in 1702 several of his children were desperately ill of the disease wasted no time. On the fourteenth of May the selectmen instructed by the freeholders had waited on the Governor with the request that the pest-ridden ship Seahorse be sent down to Governors Island. On the twenty-sixth Mather wrote in his diary, "The practise of conveying smallpox by inoculation has never been used in our nation, but how many lives might be saved by it if it were practised: I will procure a consult of physicians and lay the matter before them." On the sixth of June he issued an address calling the attention of the physicians to the new method embodying in it the two letters from the Transactions previously referred to. He requested them to meet and consult whether inoculation should be tried in the emergency then present. The immediate

result of this address was the demand of Douglas for the return of his pamphlets and his refusal to again lend them for use or comparison, but its perusal pleased Dr. Zabdiel Boylston, a practitioner of the town and as he later says in his account of what happened, "I resolved in my own mind to try the experiment, well remembering the destruction the smallpox made in Boston 19 years before and how narrowly I escaped with my life. It may make a strange figure in New England especially when one or two have made the discovery how the practise could produce the plague. As they also say that Mather did not make a fair transcribe of the observations from the Levant, I prayed that they might be read but Dr. Douglas, who owned them, refused to allow this."

It is perhaps no wonder that medical men in general paid little attention to Mather's letter. He inextricably mixed piety and medicine in many of his publications, thought disease the result of sin, sickness *Flagellum Dei pro peccato Mundi*, advised the scattering of wens by the laying on of a dead hand and eulogized the healing virtues of a solution of sowbugs. He believed in witch marks and the application of the water ordeal which, as Oliver Wendell Holmes puts it, means "Throw your grandmother into the water, if she has a mole on her arm. If she swims she is a witch and must be hanged; if she sinks the Lord have mercy on her soul." But Boylston then 42 years of age, a physician of some prominence, impressed as he says by what Mather had communicated probably talked the matter over with him and no doubt personally interviewed the slave Onesimus, who had been inoculated in Africa where he said it was done to everybody and "nobody died any more of the smallpox". In fact, as Mather himself says in the appendix to *Variolae Triumphatae*, he was informed of the wonderful new practise by this Garamantic servant some years before he was "enriched with the communications of the learned foreigners, whose accounts I found agreed with what I received from my servant, and thus in Africa where the poor creatures died like rotten sheep, a merciful God has taught them an infallible preservation. 'Tis a common practise attended with a constant success."

On the twenty-fourth of June, Mather wrote to Boylston a personal letter in which among other things he tells him, "If you should think it advisable to be proceeded in, it may save many lives that we set great value upon." Two days later Boylston inoculated his son Thomas, aged 6, and not long afterwards John, aged 13, and seven other persons.

The inspiration for inoculation in Massachusetts came then from Cotton Mather and from Cotton Mather only, but had Zabdiel Boylston not been the man he was, bold, determined,

deterred by no obstacles, even Mather's whole-souled advocacy of the new practice, the prodigious energy with which his views were promulgated and the influence of his undoubted standing in the community would never have been enough to lead so many to submit to the operation, that Boylston became in a few months the leading inoculator not only in the New World, but in the Old as well. English physicians had waited seven years before acting. Boylston, with no knowledge of what was happening there, less than three times as many days. The storm broke; the other physicians would have no part in the matter; the mob, believing that inoculation was simply giving smallpox to those who might otherwise escape, were roused to fury. A legion of incendiary pamphlets appeared. Men declared that it was impious to interfere between the Creator and his creatures, that multiplying smallpox by artificial means was a wilful tampering with death. An anonymous writer did not hesitate to say that "the ministers have generally revolted from the good old days and set up a way that their fathers knew not of". "Most of them are for it which induces me to think that it is from the devil." The clergy almost unanimously supported Boylston. The physicians almost as unanimously derided his efforts. There were times when Boylston was truly in great peril. Thatcher declares that before the excitement subsided men patrolled the town with halters threatening to hang him to the nearest tree, that he once remained secreted in a "private place" in his own house for 14 days, while parties entered by day and by night in search of him and that even after the madness of the multitude had to some degree subsided he was forced to visit his patients by night and in disguise.

A certain Dr. Dalhonde, who had a considerable reputation for his knowledge of smallpox, gave it as his opinion that the practise was attended with the most pernicious consequences. By order of the selectmen he made a deposition concerning cases he claimed to have seen in Italy 25 years before and in Flanders and in Spain, all of which went to prove that the practise was nothing better than murder. This deposition, later shown to be false as inoculation was unknown in those countries at that time, was by authority published and even reprinted in England and caused, says Boylston, "a melancholy day to inoculation in its infancy and almost set the whole town against me and my methods".

In July Boylston in a long newspaper article describes anew the process of inoculation as performed in Turkey, regrets that the gentleman, "who only hath by him the letters of the foreign physician," refused to lend them and that he can therefore not give them in full, speaks

of the considerable number of Africans in town who can have no conspiracy or combination against us and who tell us what is done in Africa and says, "I know not why it is unlawful to learn of Africans." He pays his respects to those physicians "who will neither use this certain way to save the people's lives nor let anyone else use it", and inquires whether "one who makes the experiment upon himself that thousands of precious lives, if it succeed, be preserved shall deserve to be called a murderer and not rather esteemed as a great benefactor". "I take", says he, "the case to be this. Almighty God in his great mercy to mankind has taught us a remedy to be used when the dangers of smallpox distress us; may not a Christian employ this medicine and humbly thank God for his good Providence in discovering it to a miserable world? I have made my experiments on old and young, on strong and weak, on male and female, on white and black and on a greater number than I judge proper, considering the unaccountable rage of uncounted people. I have patiently borne the clamour and fear not the rage of the people. I might make answer against the scurrilous things lately published, but I decline foolish contentions."

Boylston was called before the selectmen and ordered to discontinue the practice, but he went calmly on inoculating all who came to him, nor was he estopped when later in the year the physicians of the town, probably at the instigation of Douglas, agreed as they said, "after mature deliberation, that inoculation had moved the death of many persons and had brought distemper upon many others which in the end proved deadly to them and that the natural tendency of infusing such malignant filth into the mass of the blood is to corrupt and putrify it". One hears much of "malignant filth" from the antivaccinationists of the present day. By October, 60 persons had passed through his hands, and by November 18, when smallpox was present in every street and almost in every house, 110. The town was by this time in a panic. Work was generally suspended. Many families moved away and the selectmen, when they later made up the statistics of the epidemic, declared that but 700 of the 12,000 inhabitants had proved immune to the disease. Such was smallpox 200 years ago.

Before the epidemic was over Boylston had inoculated some 247 persons, some say 282, but a few were treated by Doctors Thompson and Roby, who took up the work in Cambridge and Charlestown. Despite the statements of the physicians but six of Boylston's patients died and if any one of these particular persons had recovered, he thinks it would have been a miracle. After reading the detailed histories of these six, I am inclined to agree with him.

Into the turmoil of abuse and opposition had

plunged the redoubtable Cotton Mather, the great religious leader of America, member of the Royal Society, a writer who left 300 books to his credit, who wrote with equal facility in Latin, Spanish, Greek, Hebrew and French, and whose English was forceful to a degree. Like Boylston he well remembered the epidemic of 1702 when three of his children suffered from the disease and he was in constant dread lest the same fate should befall the remainder of his family. Four times he alone or in conjunction with his father, Increase, and other clergymen, for the ministers were with him and against the physicians almost to a man, four times, he published pamphlets in answer to those of the opposition. "To say, as they have said", he wrote in one reply, "that we, the preachers, have been instruments of mischief and trouble both in church and state from witchcraft to inoculation is enough to make the most professed libertine blush." He speaks of papers "prostituted in hellish servitude" and states that "he knows of no nation in the world that has so openly and assiduously insulted the ministers of their God and been so strenuous in their endeavors to make them despicable and detestable to their people". But it was in his diary and particularly after a lighted hand grenade had been thrown into his chamber window and another into the sitting room of Boylston that he poured out his soul. No less than 71 references to smallpox and the attitude of the people of Boston appear between May, 1721, and July of the following year. Mather was terribly overworked, writing, debating, preaching, continually visiting the sick and called on to offer prayers for the dying. (He notes that on one day there were no less than 315 names on the prayer list of the Old North Church.) He was harassed over the serious illness of his wife. Four of his children acquired the smallpox, three in the natural way and one by inoculation. He was abused and insulted in public and in private and it is not to be wondered at that one finds allusions to "people who have Satan filling their hearts and their tongues against me and my family", to "the crying wickedness of a town strangely possessed of the devil", statements that he "should say that the town had become almost a hell on earth full of lies, murders and blasphemies, as far as wishes and speeches can make it," that he should speak of "the epidemic rage against that notable and successful way of saving the people from the dangers of smallpox" and conclude that "the miserable town is a dismal picture and emblem of hell itself". He resents, as well he might, the card tied to the grenade thrown into his house which read, "Cotton Mather, you dog. Damn you! I'll inoculate you with this with a pox to you", and speaks of "sottish errors, cursed clamors, senseless ignorance and raging wickedness, of the miser-

able, detestable and abominable town in which behold what my glorious Lord has brought me to. I have been guilty of such a crime as this. I have communicated a never failing and most allowable method of preventing death and other grievous miseries by a terrible distemper. I suffer for nothing but instructing your base physicians how to save many precious lives". But the gallant defender of what he thought was right was to live to see Dr. Douglas, his principal detractor, recant in the epidemic of 1728 and even exercise himself the erstwhile despised practise. His work in the support of Boylston is now largely forgotten, while every graduate of a primer of history is taught, as Dr. Dexter well says, "to sneer at his memory as the cruel and credulous apostle of the witchcraft mania and murders".

So many people poured into town seeking inoculation that the authorities of Boston transferred them all to the Spectacle Island Quarantine Station and Charlestown prohibited on penalty of a fine the entertainment of any person in order to receive smallpox by inoculation or otherwise. Inoculation was becoming popular. Improved methods were devised and Boylston, who had stood firm against a storm of abuse and bitterness almost unexampled, the press, civil authorities and the united profession against him, laughed at, jeered at, his life in danger, began now to be as greatly lauded as he had been a year before abused. In 1723 on the invitation of Dr. Hans Sloan, President of the Royal Society, he went to England, spoke before both the College of Physicians and the Royal Society of which latter body he was in 1726 elected a member. In eight months he had inoculated one third as many persons as were subjected to the operation in all England in the seven years 1721-1728. While in London he published his Historical Account of the Smallpox Inoculation in New England, in which he speaks of the cloud of opponents at the beginning "yet finding my account in the encouragement of good ministers I resolved to carry it on".

The death rate after inoculation in this 1721 epidemic had been 2.4%, after natural smallpox 14.8%.

In 1728 smallpox brought in by a vessel from Ireland was kept in a few families until March of the next year, when the "watches were removed" and it had free course with the result that in 1729 the General Court convened again in Cambridge and by 1730, when the epidemic ceased, there had been 4,000 cases and 500 deaths. Four hundred persons were inoculated at this time, of whom 12 died, 3%, while 13% of those taking the disease in the natural way lost their lives. The Town Council had by this time modified its views and publicly advised inoculation, and Dr. Douglas in a most ungraci-

ous letter accepted what he had so bitterly fought seven years before. He did himself no credit by writing—"How mean or rash soever the beginning of inoculation may have been, if many years practised by old women only and neglected by the sons of art in Turkey; if in another part of the world a person of no literature, of habitual rashness from the third hand hearing of an over credulous person, first attempted it indifferently to all who would pay for it, without regard to age, sex, constitution or other circumstances and cautions, which trials of such consequences require, as it is one of the inconveniences of human life that all the world over ignorance assurance and rashness pushes on some to attempt without fear or disgression what would make the most exquisite artist tremble to touch, nevertheless if in the event by repeated experiments it ought to prove useful, it ought to be embraced. And the Rev. Dr. Cotton Mather surreptitiously without the knowledge of his informer, himself, that he might have the honor of a new fangled notice sets an undaunted operator to work and in this country about 290 were inoculated." Yet this recantation ended the opposition on the part of physicians. Inoculation became an accepted procedure and with each recurring epidemic more and more submitted to it until in 1792 but 232 of the 8,346 persons who had the smallpox acquired it in the so-called natural way.

In 1751, brought in as usual by an infected ship, smallpox attacked but 124 individuals of whom 22 died. It spread slowly until May of the next year, but in December was again entirely out of control. Fences were built across streets near infected houses, flags of warning hung out, the tolling of bells at funerals suppressed, burials made at night, town meetings held in the open. Two thousand one hundred and twenty-four persons were inoculated, of whom 30 died—one in 70. Five thousand five hundred and forty-five acquired it in the natural way, 539 died—one in 11.

In 1764 the election sermon was omitted on account of the prevalence of the disease. In five weeks, 4,977 persons were inoculated, 46 died—one in 109. Six hundred and sixty-nine took it in the natural way, of whom 124 died—one in 5. Inoculation hospitals were now established at Point Shirley and Castle William. The hospital at the latter place was eventually moved to Noddles Island and Dr. Gelston, who had successfully treated 80 patients in a hospital on Martha's Vineyard, was placed in residence and Doctors Perkins, Whitworth, Lloyd and Warren were on call. It had become evident that for obvious reasons inoculation could not safely be practised in the midst of thickly settled communities.

In 1769 and again in 1773 new outbreaks caused the opening of more hospitals, one in

New Boston, the other near Marblehead. All these hospitals were chartered by the Governor.

In 1775, during the British occupation, smallpox prevailed both within and without the town and Washington's army was so seriously affected that wholesale inoculation was resorted to; 4,988 men were treated, 18 died.

In 1776 an act was passed permitting the erection of inoculation hospitals by the counties of the state and inoculation was forbidden except at such licensed hospitals. It was also provided that on the outbreak of smallpox such a hospital *must* be opened and to it all sick and infected persons removed, unless so ill that such removal would be dangerous, while any householder who failed to give notice of a case in his family was to be fined not less than ten pounds and no more than thirty.

During 1778, 2,121 inoculations were performed with 29 deaths, 9%; 122 other cases were recorded with 42 deaths, 34%.

In 1792, smallpox being brought in by a vessel from Ireland, practically the whole town was inoculated within a few days. The desirability of this procedure was now almost universally accepted. There were, however, at least as late as 1798 a few conscientious objectors still believing that inoculation would be followed by divine punishment. So common was the procedure, so freely did the inoculated mingle with the general public, that smallpox was being kept alive by the very means used to modify it and was indeed the reigning disease until the end of the century, it being estimated that in the years between 1700 and 1800 in Europe alone, whether acquired by inoculation or in the so-called natural way, it was responsible for no less than 60,000,000 deaths.

The 1792 legislature recognized the dangers of inoculation as then practised and redrafting the act of 1776 provided that on the outbreak of smallpox all infected persons must be removed to a hospital devoted to their care, repealed the rather drastic fine of ten pounds and thirty pounds for non-notification, forbade on penalty of \$200 the inoculation of any person or one's self or the allowance of one's self to be inoculated save in such licensed hospital and ordered a display of red flags to warn travelers. Householders, physicians and others, who neglected to notify the authorities of smallpox on their premises were to be fined \$100 and anyone violating any of these provisions was assessed a similar sum.

In 1797 it was in addition provided that if a person could for any reason not be moved to a hospital, provision must be made for him in the house in which he might be, persons in the neighborhood to be removed by the Board of Health. The Board of Health might also turn back travelers, prevent them from moving without a license, make them return to the place

from whence they came and fine them for disobedience not more than \$100. It was also specifically provided that under order of a justice of the peace such Board might secure baggage, clothing, etc., supposed to be infected, might break open any house or shop, might require any person to render aid and that such person must serve or be fined \$10.

In the one hundred years before inoculation there had been 12 distinct epidemics of smallpox, in the 80 years during which inoculation was used eight. In the 129 years since the introduction of vaccination two general outbreaks have occurred and two only, and yet there are those who say that vaccination is of no value and a gentleman now or formerly the President of the American Medical Liberty League writes to me in this year of grace to say that smallpox is not even contagious.

In 1799 Dr. Benjamin Waterhouse of Cambridge received from Dr. Lettsom of London a copy of Edward Jenner's Inquiry into the Causes and Effects of the Variolae Vaccinae or Cowpox published the year before. Waterhouse then Hersey Professor of Theory and Practise in the Medical School was probably the best educated physician in the State at that time, having spent seven years in study in London, Edinburgh and Leyden. Dressing always in formal broadcloth and carrying a gold-headed cane, somewhat condescending to his fellow practitioners whose knowledge he held in little esteem, contentious to a fault, with manners by no means agreeable, he was always in hot water and was eventually deprived of his professorship at the demand of all the other teachers in the school. A Jeffersonian democrat when all his associates were Federalists, a member of the unpopular Society of Friends, a person almost universally disliked, this man of action overcoming all handicaps was nevertheless able by hard work, persistence and the brilliancy of his intellect to place vaccination on a firm basis in this country for which work he was honored by scientific societies both here and abroad and by the London Medical Society voted the title of the American Jenner. He, like Boylston before him, lost no time in placing himself on record for on March 12 of the same year, 1799, he published in the *Columbian Sentinel* a short account of the new inoculation method under the title of "Something Curious in the Medical Line." As he himself says, this attracted but little attention. "A few received it, some doubted it, some observed that wise and prudent conduct which allows them to condemn or applaud as the event might prove, the greater number absolutely ridiculed it." Later in the year, before a meeting of the American Academy of Arts and Sciences he read a paper based on Jenner's pamphlet and quoted as much as he could remember of "Pear-



son's Inquiry into the History of Cowpox", a book which he had loaned and lost. At the next quarterly meeting he read extracts from Woodville's book just received. Woodville made a bad blunder when he vaccinated a number of persons and then in four to five days inoculated them with smallpox virus, thus producing both vaccinia and smallpox. This contaminated virus used as cowpox virus spread smallpox far and wide and owing to Woodville's prominence in the medical world came near to shipwrecking the great discovery.

Waterhouse finding, as he says, the evidence in support of the efficacy of vaccination too great to be resisted by any mind not perverted by prejudice, tried to obtain the virus in an active state. After several fruitless attempts he at length received some from Dr. Haygarth of Bath and on July 8, 1800 vaccinated his son Daniel, aged five. The course of the disease being typical, he vaccinated another son, aged three, with virus from the arm of the first, then a servant boy of twelve with the imported material and finally an infant of one with its nurse both from the arm of the three year old. Be it noted that he as well as both Lady Montague and Boylston before him, only after he had convinced himself by experiments on his own family attempted to induce other people to follow his example. As Waterhouse invited some of the physicians to see the boy the first of a long series of perversions of fact began in a report industriously circulated that one of his children was so ill that a consultation of several members of the faculty was required. Many persons now applied to him begging for vaccination, but he refused to proceed until he had proved that the new agent really gave the protection that he was convinced it did. He therefore wrote to Dr. Aspinwall, a specialist in inoculation, who was in charge of the smallpox hospital in Brookline in part as follows:

"I have collected everything that has been printed respecting this distemper cowpox and have been so thoroughly convinced of its importance to humanity that I have procured some of the vaccine matter and therewith inoculated seven members of my family. My desire is to confirm the doctrine by having some of them inoculated by you. I can obtain variolous matter and inoculate them privately, but I wish to do it in the most open public way possible. As I have imported a new distemper I conceive the public have a right to know exactly every step I take in it. I write therefore to inquire whether you will on philanthropic principles try the experiment of inoculating some of my children who have undergone the cowpox. If you accede to my proposal I shall consider it an experiment in which we have co-operated for the good of our fellow citizens."

Dr. Aspinwall, whose living it must be remembered depended on the prevalence of smallpox, at once consented and two months after vaccination the children were sent to him, exposed to the infection of smallpox in the hospital and inoculated with fresh matter taken from a patient. Subjected to this most crucial test with absolute resistance to the disease Waterhouse was justified in saying as he did, "One fact in such cases is worth a thousand arguments." Of Aspinwall he said afterwards, "He took all those of my family whom I had vaccinated into his smallpox hospital and there tested them to his satisfaction and then said to me and to others, 'This is no sham. As a man of humanity I rejoice in it though it will take from me a handsome annual income.'" There was trouble with inert vaccine and it was necessary to obtain new supplies; there was trouble with vaccination improperly done or done by incompetent persons; vaccine contaminated with smallpox virus came into the country as Dr. A. K. Stone has pointed out. The other physicians so disliked Waterhouse that they were prejudiced against anything that he advocated and it was nearly two years after President Jefferson wrote to him speaking of his firmness and perseverance maintained against the persecution of his enemies, religious, political and professional that he was able to persuade the Board of Health to endorse the experiment which was to settle once and for all the question of the value of vaccination as a preventive of smallpox.

Undismayed by the rejecting in 1800 of a similar request made by James Jackson who had studied under Woodville and had supported him (Waterhouse) in his work as a vaccinator, he arranged in August 1802 for the admission of 19 children vaccinated in the preceding November to the smallpox hospital at Noddles Island, where they remained for twenty days constantly exposed to infection and were one and all inoculated with smallpox virus. Not one of these children developed the disease, but two unvaccinated children admitted at the same time and also inoculated showed the typical variolous pustules in profusion. Matter was then taken from these children and the 19 re-inoculated, again with no result. There was nothing more to be said. The value of vaccination was conclusively proved. All these proceedings were under the supervision of a committee of physicians consisting of James Lloyd, Samuel Danforth, Isaac Rand, John Jeffries, John Warren and Charles Jarvis. Waterhouse's memorial to the Board of Health is a model of persuasive argument. He speaks of vaccination as the most important discovery since the world began, it being no less than the extermination of the most loathsome and widely wasting pestilence that Providence ever permitted to affect the human race. He gives the story of Jenner in de-

tail, derides those wise sceptics on account of the so-called lowly origin of the practise and ends by telling the Board that the proposition is brought forward by no cringing solicitor but by a man conscious of his duty and zealous in producing a public benefit of more value to Boston than all the riches contained within its limits. "You are not asked", said he, "to accept blindly but to cause a rigid inquiry to be made as to the truth of my assertions and have them subjected to the test of a public experiment by a set of men whose knowledge, age and virtues will create confidence and inspire satisfaction." And this was the man who among other things had been publicly denounced as "an old drone enjoying the sweets of the beehive without assisting in the labor or paying for the privilege of humming and buzzing".

Verily the path of those who have tried to banish smallpox from Massachusetts has been a stony one and the attitude of our profession toward these men and women has not always been one of which to be particularly proud. Indifference, ridicule and opposition hindered the few whose clearer vision and greater courage led them to experiment with the new methods and as we shall see later overconfidence and a desire to save themselves and their patients from trouble set back the clock, undid much of the work already accomplished and allowed the almost banished disease to return and plague the community for a long period of years. It was eight years after the first vaccination and six after the Noddles Island experiment that a committee of the Massachusetts Medical Society reported to the annual meeting that persons who undergo the cowpox are thereby rendered as incapable of being affected by the virus of smallpox as if they had undergone the latter disease.

In 1809 the town of Milton repeated the Noddles Island experiment with identical results and in that year the Legislature ordered that every town, district and plantation where no board of health existed should choose three or more persons to supervise the inoculation of the inhabitants with cowpox, in 1816 that a smallpox patient might be removed from a jail to a hospital under guard and in 1827 that a physician visiting a patient having smallpox must give notice to the authorities.

Vaccination had supplanted inoculation. Smallpox had disappeared as a major disease. There had been no epidemic since 1792 and between 1811 and 1837 there were but 39 deaths from the disease in Boston. And then the physicians as confident as they had been hesitant in 1800 appear in the guise of a committee of the Massachusetts Medical Society before the Joint Committee on the Judiciary complaining that the laws passed in 1792 and 1797 were useless, vexatious and burdensome, that personal rights

were interfered with, individuals and the public subjected to unnecessary expense, deprived of the comforts of home by removal to public hospitals and that physicians were now compelled to report these cases to the proper authorities and thus subject their patients to the provisions of severe and as they believed unnecessary laws. This petition was signed by twenty prominent persons, thirteen of whom were physicians, among them John C. Warren and James Jackson. The result was most disastrous, for the Legislature at its next session repealed practically all laws for the control of smallpox. Immediate transfer to a hospital was no longer required, isolation of those not so transferred no longer compulsory, flags were no longer to be displayed, travelers turned back, nor physicians obliged to report cases, and the whole system of fines was abolished. But, as Dr. Burrage notes in his history of the Society, the Committee proud of its work reported back to the Council, expressed its confidence in vaccination and the Council voted that this Society should furnish free vaccine to all Fellows who applied for it, but that it was the duty of every Fellow to vaccinate gratuitously on each Monday of the month of June annually all persons who might come to them and be unable to pay the usual fee. This vote has never been repealed and this duty is, I must assume, still annually performed.

In 1839 and 1840 physicians were again ordered to report cases and fines for neglect were again legal, but with these exceptions no further changes in the laws were made until 1855, seventeen years later.

Following this legislative action of 1838 smallpox at once increased, there being in Boston alone 1,032 deaths in those 17 years, in contrast to the 39 of the previous 26. This could not be allowed to continue and in 1855 the legislature enacted laws much more drastic than those of 1792 thrown into the discard 17 years before. The managers of manufacturing companies, the superintendents of almshouses, state schools, lunatic hospitals, masters of houses of correction, jailers, prison helpers and the heads of all other institutions supported in whole or in part by the State were ordered to immediately cause to be vaccinated all inmates and all entrants. Boards of health were given authority at any time to vaccinate all the inhabitants of any town. A parent or guardian who neglected to cause his child or ward to be vaccinated before he attained the age of two, unless he had the certificate of a physician that said child was unfit, was to forfeit \$5 for every year during which such neglect continued and the school committees of towns and cities were ordered to allow no unvaccinated child to be admitted to or connected with the public schools. There was, however, no efficient enforcement machinery in existence. The State Board of Health was not formed until 1869, 14 years later, although a bill for its establishment had been introduced as early as

1849, and throughout the fifties and sixties the yearly deaths from smallpox were not materially diminished, the average for the next 18 years standing at 150 culminating in the general epidemic of 1872-3, incidentally the first one for 80 years with its 1,697 fatal cases, 1,040 of which were in Boston. That epidemic proved to be a disguised blessing, for vaccination again became popular, the vaccination laws were more rigorously enforced and since that date, with the exception of the state-wide outbreak in 1901-1902 with its 3,509 cases and 381 deaths, there has been no year in which the fatal cases have exceeded 100, and there have been a number of years with no deaths, the total fatalities in the 59 years excluding the outbreak above mentioned being but 419, 26 of which have occurred since 1913.

The 1855 laws were somewhat modified in 1884 and again in 1894. With a physician's certificate an unvaccinated child was allowed to attend school. Per contra children from homes where contagious diseases were present were rigidly excluded. Employees in manufacturing establishments and inmates of institutions were to be vaccinated as all other persons only on orders of the Boards of Health. The provision which exempted from the school law the unvaccinated child with the physician's certificate was repealed in 1902 to be reenacted in 1908 in which latter year the infant vaccination law was wiped from the slate, despite the strong opposition of Dr. George W. Gay, at that time President of this Society.

For more than fifty years annual attacks have been made by the anti-vaccinationists, conscientious objectors and Christian Scientists on the school law, fortunately so far without avail. The law has in fact been strengthened by providing that the physician giving an exemption certificate should at least have seen the patient, which in the past had not always been the case.

Smallpox has become instead of the most dreaded and virulent of diseases one comparatively rare in this State, one not too difficult to control when it does occur, one absolutely preventable were vaccination universal, yet a persistent, well-organized, well-financed opposition tries year after year to throw open the doors to

the enemy always ready to enter and in due time bring us to the condition of our forefathers, smallpox always present with a serious epidemic every ten to twenty years.

In no state in the Union has more, not even so much, been done to control, mitigate and finally almost suppress the disease so easily robbed of its terrors, so easily banished, but so ignorantly allowed to run its course almost unchecked in a large portion of the country. It is a melancholy fact that the countrymen of Jenner, Boylston, Waterhouse and Lady Montague lag so far behind those of other races and other countries in these controlling efforts. It is shameful to read in the *Epidemiologic Intelligence of the League of Nations* that while India reported 148,199 cases of smallpox in 1929, the United States 41,705 and England 10,967 no other country reported over 1,000; and still more so to learn from the same source that in 1930 there were 46,712 cases reported in the United States, 11,839 in England and Wales and but 268 in all continental Europe exclusive of Spain, Portugal, Greece and Russia. Nor can we read with satisfaction in this same report that the efficacy of smallpox vaccination in preventing and limiting outbreaks is clearly shown by the progressive decline or even the eradication of smallpox in countries of central and eastern Europe where vaccination has become general, while the disease persists or even spreads in England and the United States where vaccination is not in fact universally compulsory. The death rate is at present in most countries low, but its virulence may at any time increase as it has repeatedly done in recent outbreaks in the middle west. Forty-eight thousand died of smallpox in India in 1930, nobody knows how many in China, and while virulent smallpox exists anywhere in the world an unvaccinated community is always in danger.

It is only by the most persistent efforts that our law requiring the vaccination of public school children has been kept in the statutes and more or less persistent efforts kept up for now 17 years have failed to extend the aegis of compulsory vaccination over those attending our private and parochial schools. Some day it will come. When, I do not know.