in 1492. Thus we must not fall into the error of thinking that the sixteenth century saw the introduction of many new diseases into Europe. Many were clearly described and, because they were printed, the descriptions are known to us today, but the diseases antedate the descriptions.

By the seventeenth century physicians were beginning to distinguish measles from smallpox, and the 1629 Bills of Mortality for London contain measles under a separate heading. Not many deaths are recorded, but two epidemics occurred in 1664 and 1670, causing 311 and 295 deaths respectively. In 1674 came a more serious outbreak with 795 deaths; after this measles declined until the epidemic of 1705, which caused 800 deaths. From the beginning of the eighteenth century, epidemics became more frequent and, towards the end of the period, occurred once in about every three years. There were unusually bad epidemics, with a high mortality in 1718 and 1733. These coincided with a time of excessive gin-drinking, which has sometimes been held to blame. In so far as the parents would have been in no condition to nurse their children efficiently, gin may have indirectly affected the mortality; good nursing can greatly decrease the mortality of measles, for death does not occur from measles itself but from its complications, chiefly pulmonary or of the ear.

So far as can be judged, the type of measles encountered in the eighteenth century was generally mild. In 1785 William Heberden of London stated that it was rarely necessary to call in a doctor. In 1762 the French physician Tissot pointed out that measles rarely killed; when death occurred, it was due to some complication. Towards the end of the century the European picture changed: the disease became far more common, more dangerous and more widespread. This was the beginning of the great epoch of measles, when hardly a child in Europe escaped infection, when major epidemics occurred in every second year, when measles was one of the more common causes of death in childhood. In the twentieth century, measles apparently became less virulent but it is a better standard of living, more educated child care and

smaller families, rather than medical advances in treatment, which have lessened mortality.

From the sixteenth until the beginning of the twentieth century the European has carried measles with him on all his explorations, often with devastating results. New Spain was infected quite early in the sixteenth century; some historians believe that 'the small leprosy' which ravaged Mexico in 1531 was measles rather than smallpox. In North America, wide spaces and a scattered population, with frequent immigration from Europe, produced a rather different pattern of infection. Epidemics tended to be less frequent, more severe when they occurred, and attacking people of all ages rather than young children. The first known epidemics were in Canada in 1635 and 1687. Boston was attacked in 1657 and again in 1687, the latter possibly being an import from Canada. Further epidemics occurred in 1713, 1729, 1739 and much more severely in 1740. South Carolina, Pennsylvania, New York, Connecticut and the remainder of Massachusetts were attacked in 1747 and then there was no major outbreak until 1759. This was followed by an epidemic in 1772, which was particularly severe in Boston and surrounding districts: 800 children are said to have died in Charlestown, Massachusetts. Six years later, in 1788, New York and Philadelphia were ravaged by measles. The disease followed the covered wagon, appearing first in the Mississippi valley and then in Kentucky and Ohio.

The course taken by measles in America was dictated not by the nature of the disease but by the growth and cohesion of population. Scattered communities were separately infected and a considerable time might elapse before such a community was again attacked. If the lapse of time was twenty years, then all age groups up to twenty years were at risk and the age incidence might be widened by the immigration of adults from uninfected areas. As the distance between centres decreased and communication became easier, so the chance of infection increased. Thus epidemics became more frequent until the nineteenth century, when rapid travel and greater density of population changed the pattern into one similar to that obtaining in Europe. Measles, in fact, became an

endemic disease of America, never entirely absent, and reaching epidemic proportions at intervals.

But nineteenth-century speed of communication was not confined to Europe and America. Slow travel by sailing ship over long sea routes gave place to the faster steamer. Rapid contact could be made with communities which had hitherto been entirely cut off, or visited at rare intervals after months of voyage without touching land. Thus certain island communities received the full weight of an infection which they had never before experienced. Since they had never been infected, the individuals possessed no immunity, either maternal or acquired. In circumstances such as these, the disease would spread with frightful rapidity, all ages would be at risk, and mortality would be unusually high.

The most important of these island epidemics from a medical point of view is that which struck the Faroes in 1846. The Faroe islanders had already experienced measles, but no case occurred between 1781 and 1846; that is to say, no one under the age of sixty-five could have been immune. On 20 March 1846, a workman left Copenhagen, landed in the Faroes on 28 March, and developed symptoms of measles on 1 April. The population of the Faroes numbered 7,864; 6,100 fell sick of measles between the end of April and October, the number of deaths being 102. The mortality, expressed as 1.6 per cent of infected cases, is certainly not very high for those times.

The medical interest of this outbreak lies in the fact that the Danish government sent a twenty-six-year-old doctor, P. L. Panum, to deal with the situation. Panum took the opportunity of making a close study of the epidemic and much of the knowledge of measles derives from his work. He found that there is an incubation period of 13-14 days during which the patient can transmit the disease, a very actively infectious period while the typical measles rash is present, and then a non-infectious stage of desquamation or 'peeling'. Panum concluded that measles can only be carried by direct contact between individual and individual and that isolation of all known contacts is the best method of controlling an epidemic.

He also suggested that one attack of measles conferred life-long immunity, for he found that not one of the ninety-eight inhabitants who had suffered from measles in 1781 developed the disease in 1846. Panum's theory was proved when measles again struck the Faroes in 1875, for only persons under thirty years of age were attacked.

In the same year of the Faroe Island epidemic, 1846, an entirely different type of outbreak occurred among the native Indian population of the Hudson Bay Territory in North Canada. In this small epidemic, lasting for just six weeks, 145 people of all ages fell sick and no less than forty died, a mortality which can be expressed as well over 25 per cent. More recently an example occurred of what will happen when a community, previously isolated, is brought into sudden contact with a centre of endemic infection. At the beginning of the First World War, a Highland Division from the sparsely populated north of Scotland was encamped at Bedford in the south-east of England. From October 1914 until March 1915, they experienced 529 cases of measles with sixty-five deaths, a mortality of 12.3 per cent. The disease was commonest and most lethal among those men who had come from the remoter parts of the Highlands.

We cannot claim that any of the outbreaks so far described exerted a major effect upon the course of history. But the story is rather different when we consider the population tragedy which measles brought to the islands of the South Pacific in 1875. In 1872 epidemic measles developed in South Africa, spreading to Mauritius in 1873-4 and to South Australia in 1874. On 10 October 1874, the British Government annexed the Fiji group. Early in 1875 a cruiser, H.M.S. *Dido*, visited the islands. A few sailors had fallen sick of measles and some, only slightly ill, were permitted to land while still in the acutely infectious stage.

Within a little over three months, at least one-fifth and probably more nearly a quarter of the native Fijian population died; the total number of deaths in the Fiji group alone was over 40,000. The panic which developed must have been something like that attending the Black Death in Europe six

centuries before. A contemporary writer, William Squire, believed that many natives died from sheer terror, others from seeking relief by immersing their fever-stricken bodies for long periods in the sea. Squire added that 'the epidemic only ceased when every person had been attacked'. From the Fiji group measles passed to all of the South Pacific island communities, with equally devastating results. It was not the only gift which civilization brought: tuberculosis and syphilis caused many deaths and helped to ruin the physique of the magnificent island races. No one knows how many died; it is widely believed that disease has reduced the South Pacific native population to about one-tenth of the number who lived in the islands a century ago.