

## THE IRISH FAMINE: A CENTURY AND A HALF ON

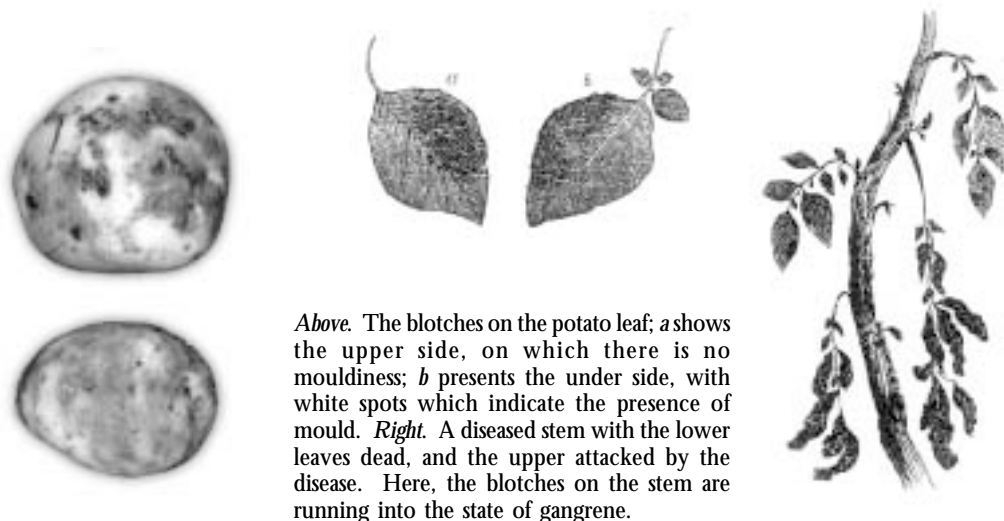
A. A. McConnell,\* *Department of Clinical Biochemistry, Inverclyde Royal Hospital, Greenock PA16 OXN* and D. T. Reid, *formerly of Scottish Office Agriculture, Environment and Fisheries Department*

The Great Hunger (*An Gorta Mór*) of 1845-52, which saw the death of a million people and the emigration of at least a million and a half from Ireland, was caused by the fungus *Phytophthora infestans* destroying the potato (*Solanum tuberosum*) crop upon which the population had become nutritionally extremely dependent. There is currently a great deal of interest in the 150th anniversary of this terrible period, and this article seeks to present an integrated overview.

### THE POTATO AND THE BLIGHT

The potato, and probably the fungus also, originated in the Americas, the former in the Andes and the latter in the central highlands of Mexico.<sup>1</sup> The potato was originally introduced to Europe from South America in the late sixteenth century, following the Spanish conquests; the first written account describes its introduction into the Canary Islands in 1567.<sup>2</sup> The subspecies introduced was *S. tuberosum* subsp. *andigena*, and this limited genetic pool, and the subsequent selections made from it, became the basis of the European food crop. The reliance on the potato as a staple dietary item contributed to the disastrous famine of the late 1840s.

The first recorded observation of the interaction between the fungus and the potato (Figure 1) that produced the potato blight (officially called 'late blight') was in the



*Above.* The blotches on the potato leaf; *a* shows the upper side, on which there is no mouldiness; *b* presents the under side, with white spots which indicate the presence of mould. *Right.* A diseased stem with the lower leaves dead, and the upper attacked by the disease. Here, the blotches on the stem are running into the state of gangrene.

FIGURE 1

The plant pathology of potato blight. Illustrations courtesy of the National Library of Ireland.

\*Consultant Chemical Pathologist.

neighbourhood of Philadelphia around 1843, and by the summer of 1845 it had spread to Western Europe, probably by ships carrying natural fertilizer.<sup>3</sup> The first published report of its occurrence in the British Isles appeared in the *Gardeners' Chronicle* of 16 August 1845, in which Dr Bell Slater reported a new potato disease which began in the Isle of Wight.<sup>4</sup> It reached Ireland in early September of that year (Figure 2).<sup>5</sup>



FIGURE 2

Stop-press news in *The Gardeners' Chronicle* - a portent of disaster.  
 Courtesy of the National Library of Ireland.

Planting of infected tubers, as well as the concomitant use of infected guano (fertilizer) from South America, may have contributed to the spread of the disease.<sup>6</sup>

The cause of this 'late blight' was a source of controversy at the time. It was stated by Dr Lankaster<sup>7</sup> 'that the fungi were the cause had now been disproved by the best chemists' and this was not atypical of contemporary scientific opinion on the matter. It was not until the period 1861-63 that de Bary published his two definitive papers which conclusively established the fungus as the pathogen in 'late blight'.<sup>8,9</sup> Considering the time taken to clarify the pathology of illnesses such as HIV infection or BSE in cattle in modern times, served as we are by all of today's technology, then the performance of the nineteenth century workers is to be commended.

The surprisingly rapid spread of the disease over long distances is now recognised to be due to the manner of propagation of the causative fungus: each fungal lesion on every leaf is capable of producing 300,000 spores every five days; these spores are easily shed into dry air and are readily carried and spread by the wind, so that a field of potatoes could be completely destroyed in a few days.<sup>1</sup>

The initial manifestation of 'late blight' is the appearance of dark spots on the leaves, with subsequent development of a furry growth thereon.<sup>3</sup> The leaves and stems then decay, resulting in the death of the plant. Concomitantly the underground

The seed will cost, at least	4	0	0
County cess, at 5s an acre	2	10	0
Poor-rates at 1s an acre	0	10	0
No tithe here	0	0	0
The farmer labours himself, and estimating his labour at the usual wages of a labourer	10	0	0
Tenant-right of ten acres at £4, £40; interest of £40 at 5%	2	0	0
Rent of the land	10	0	0
Profit of the farmer for his care, skill and diligence	1	0	0
	£30	0	0

FIGURE 3  
Balance sheet of a ten-acre farm in 1845.<sup>12</sup>



FIGURE 4  
An evicted family (1880s) outside their cottage, with the door nailed up to prevent their return, a familiar scene of the Famine period. Courtesy of the National Library of Ireland.

potato tubers become discoloured and are converted into a darkly-coloured pulp, which is associated with a distinctive odour, the entire process occurring within the course of a few days. Such a destructive process occurs more readily and rapidly in cool, moist conditions as found in cultivated fields.<sup>10</sup>

Before the Famine, the majority of the Irish population survived on a satisfactory diet, consisting mainly of potatoes but supplemented by milk or buttermilk which provided the nutrients and vitamins missing from the potato.<sup>11</sup> (Figures 3 and 4.) The cow, or more often the pig, which was also nourished on the potato, was not eaten by the owner but was instead retained and in due course sold to pay the rent.<sup>13</sup> Despite the proximity of rivers and coast, fish and shellfish were not an alternative source of nutrition in Ireland for a number of reasons, not least the fact that many rivers and shorelines were privately controlled, fishing tackle was relatively primitive (and was sold in the early stages of famine), and furthermore, herring shoals had moved away



FIGURE 5  
Scene from the *Pictorial Times* of 10 October 1846, showing a food riot in Dungarvan.  
Courtesy of the National Library of Ireland.

Louisburgh, Westport, 27 April 1846.

Sir, I beg to acknowledge the receipt of your letter of the 24th instant conveying to me the request of the Commissioners to communicate with the Lieutenant of the County Mayo with a view to his appointing a committee of relief for this distressed district.

I beg to state for the information of the Commissioners that we do not know the address of the Lieutenant of this county; we are informed that he is, at present, in some part of England. I beg further to say that I deplore the existence of any necessity to urge the Commissioners to give such directions, as the destitution and wretchedness of the people are so very close upon us, and have already been felt by many of the people, that relief should be given promptly and immediately; the small quantities of potatoes that are for sale have reached already a famine price. Typhus fever, diarrhoea and dysentery are rife amongst the people, many of whom have fallen victims to their virulence. There is but one resident gentleman in this parish - Mr James Garvey of Tully; there are no magistrates, none but the clergy to convey the wants of the people. Under these circumstances, a committee has been formed today, composed of individuals best qualified to administer to a suffering people the relief of government, viz: Mr James Garvey, Doctors Fergus and Durkin, Messrs John Comber, George Lynch and Michael Carroll, along with the local clergy.

Now, I beg most earnestly to submit that we have done everything in our power to meet the reasonable wishes of the Commissioners. In the absence of any of the magistracy - in the absence of the Lieutenant of the county, and with absentee landlords, we do not see what else we could do but what we have done. We beg, therefore, most earnestly of the Commissioners not to suffer the people to starve. We seek not alms, we solicit employment. But, whatever the mode of relief be, we again repeat our hope that the people will not be allowed to starve.

I have the honour to be,

Sir, your obedient servant, Patrick MacManus, Parish Priest of Kilgeever.

FIGURE 6  
A desperate request for help demonstrating some of the problems faced by the local people.  
Courtesy of the National Library of Ireland.

from Irish waters to other areas in the 1830s.<sup>14</sup> As well as being such a nutritious crop, the potato has the additional advantages of cleaning, restoring and reclaiming the soil.<sup>15</sup>

The danger of relying so heavily on a single source of food, which could not be stored during years of plenty for potential future shortages, had been pointed out as early as 1839 by Captain Chad R.N., who had been involved in the administration of famine relief in the Midlands (of England): grain is much easier to store than potatoes.<sup>16</sup> The consequences of reliance upon a single crop soon became apparent. Writing in January 1847, W. E. Forster<sup>17</sup> described the situation in Bundorragha (in Galway) where the population:

were like walking skeletons, the men stamped with the livid mark of hunger, the children crying with pain, the women, in some of the cabins, too weak to stand... all the sheep were gone, all the cows, all the poultry killed, only one pig left. The very dogs...had disappeared.

#### MALNUTRITION AND THE CONSEQUENCES

The unavailability of the potato, a good source of vitamin C, soon resulted in scurvy among the population, since other vegetables or fruit did not form part of the Irish diet. Large numbers of cases of severe purpuric scurvy occurred, with the legs turning black up to the middle of the thigh: the colloquial name for scurvy in the Irish language is 'black leg'.<sup>18</sup> Because of the loss of the family cow, and thus of milk or dairy products, severe vitamin A deficiency also occurred, leading to blindness and insanity. Classic 'hunger oedema' due to thiamine deficiency (beri-beri) was also prevalent during the Famine.<sup>18</sup> Nutritional marasmus caused by a very low level of all nutrients, particularly protein, also became widespread. It was, of course, not until the early years of the twentieth century that the scientific investigation of the role of vitamins and of their deficiency states began to develop.<sup>19</sup> (Figures 5 and 6.)

In the wake of famine, there appeared 'famine fever', which was due to two separate disease entities, viz. typhus and relapsing fever, both endemic in Europe at the time, and both transmitted by the common louse. Typhus is a rickettsial infection, while relapsing fever (which may also be tick-borne) is due to spirochetes of the genus *Borrelia*; these organisms enter the bloodstream through the skin.<sup>20</sup>

Diarrhoeal illnesses also followed closely in the wake of the malnutrition. Another endemic infection, dysentery (due to the faecal-oral transmission of bacilli of the genus *Shigella*) greatly increased in incidence in Ireland during the Famine: it is recorded that 25,000 deaths in 1847 were due to this cause.<sup>21</sup> In 1848, cholera (caused by the bacillus *Vibrio cholerae*, and transmitted by water-borne spread or by faecal-oral spread) accounted for over 30,000 deaths in that year.<sup>21</sup> Deaths from typhus in 1847 were recorded at 57,000.<sup>21</sup> In view of the limitations of public health medicine at the time, these mortality statistics are likely to be considerable underestimates (Figure 7).

The reasons for the dramatic increases in these various infectious diseases during the Famine, when the public health administrative infrastructure was basically unaltered, require an explanation. While there was indeed a worsening of living conditions due to overcrowding, eviction and increasing poverty, impaired immunity probably added to the burden. It is now known that the body's immunological defences are impaired by malnutrition, in particular T-cell function.<sup>22</sup> In addition, the bactericidal activity of polymorphonuclear cells involved in the immune response is decreased in starvation,<sup>23,24</sup> and there is also a decrease in the humoral immune mechanism.<sup>25,26</sup> Thus the body's intrinsic defences are severely impaired in combined protein-calorie malnourishment.

As well as impairment of the immune system, malnutrition<sup>22</sup> adversely affects the body's ability to (i) maintain adequate levels of tissue oxygenation (due to concomitant

(EIGHTH EDITION.)

## Advice to prevent Fever, and other Infectious Diseases amongst the Poor.

**ROSCREA DISPENSARY**—Open until **ELEVEN O'CLOCK**, on the Mornings of **MONDAYS, THURSDAYS and SATURDAYS**, where the following Advice is supplied to the Public, free of expense, and where early and timely Medical Assistance should be applied for by the Poor.

"Admit pure air, 'twill aid your health:  
In that you know, consists your wealth,  
When Fever lurks, delay not cure,  
But haste, some Medicine to procure."  
MARTIN DOYLE.

No. 1.—Let your doors and windows be kept open in the day; if you have not a window in the back part of your house, make one; have them hung so as to be easily opened; have a chimney with a good draught, so as to encourage a free current of air through your house.

No. 2.—Remove dung and putrid matter of every kind, from before, and from behind your houses, as the vapour and smell proceeding from them (called "Malaria") has been found by Physicians to generate infectious Fever.

No. 3.—Scrape your floors with a spade and sweep them every day; also the yards before and behind your houses as often as you can; keep your hair cut short and comb it every day; wash your hands and face; keep your clothes, furniture, and utensils sweet and clean.

No. 4.—Do not, by any means, indulge in the use of spiritous or other fermented liquors, as intemperance in their use will to a certainty, render you more susceptible of contagion.

No. 5.—Potatoes, and other vegetables badly cooked, or half-baked, as is a prevailing custom amongst the poor, are most unwholesome food.

No. 6.—Lying on beds placed on the ground is very injurious to the health. Every family is recommended to be provided with bedsteads, bedtick and bedding.

No. 7.—Attention should be paid to have the houses kept daily open, and if necessary, some gentle aperient medicine should be occasionally made use of for this purpose.

No. 8.—Do not go into any house where a person is sick, or has been ill of Fever; do not attend the wake of any person who has died of fever; if you do so you will be infected yourself, and will communicate fever to your family.

No. 9.—Do not let Strolling Beggars enter your houses as they frequently carry infection from one house to another.

No. 10.—Whitewash your walls inside and outside, with lime slacked in the house; and while it continues hot and bubbling; let this be done once a month while fever is prevalent.

No. 11.—If fever attacks your family; as soon as the calamity is removed by recovery, or by death, employ the above means as soon as possible; burn the seams of the beds; put all the clothes of the house into cold water, or into a strong solution of chloride of lime, one ounce to a quart of water, wring them out and wash them in hot water, soap and pot-ashes; let every box, drawer, chest, &c. &c. be emptied and washed, and let the floor under the patient's bed be strewn with lime fresh-slacked and hot. Let no person upon recovery go into a neighbour's house, nor into any public place of worship for fourteen days.

No. 12.—Heads of Families are strongly recommended to have a printed copy of this Advice pasted up in their houses, and to enforce a strict observance of its instructions.

No. 13.—The Gentry are advised only to give employment to such persons as carefully attend to the rules therein contained.

No. 14.—A strict adherence to this plan constitutes the *sole* means for removing the principle cause which generates Typhus Fever in Ireland, viz:—*The fetid smell (called "Malaria") exhaled from animal and vegetable substances in a state of putrid fermentation.*

No. 15.—It is reasonable to hope, that every other cause will be eradicated by comfortable clothing, wholesome food, and good lodgings, which comforts, can only be obtained, through the medium of constant employment given to the poor.

No. 16.—REMEMBER!!!—That Cleanliness and good air will improve your health and strength, will check disease, and UNDER GOD will preserve you from all the variety of wretchedness and misery occasioned by INFECTIOUS FEVER.

WM. KINGSLEY, Physician to the  
Fever-Hospital and Dispensary  
Roscrea, &c.

Printed by the General and Literary Printing Office, at P. O. No. 11, St. Michael's Street, Dublin.

FIGURE 7  
Advice to the public on how to avoid infectious diseases.  
Courtesy of the National Library of Ireland.

anaemia and an increase in the incidence of pneumonia); (ii) control water and electrolyte balance, which may result in life-threatening cardiac arrhythmias and cardiac failure; (iii) maintain body temperature, particularly in cold conditions; and (iv) maintain the excretion of breakdown products and the inactivation of free radicals (which cause tissue damage), as well as the elimination of toxins. According to the 'muscle mass hypothesis' of Briend *et al*,<sup>27</sup> once the ratio of body muscle mass to the mass of energy-requiring organs (principally the brain) falls by a significant amount, then the outlook becomes poor. The ultimate immediate cause of death, however, is usually an infection, particularly involving the gastrointestinal tract and/or the respiratory tract.



Thus far the causal links between *Phytophthora infestans* and the death of a million people have been described in a purely biological framework. Famines, however, are not caused by food scarcity alone,<sup>28</sup> although it is by definition the case that during famines one finds large numbers of people dying as a direct or indirect result of inadequate food.<sup>29</sup> In her authoritative book Mary E. Daly<sup>30</sup> quotes William A. Dando: 'Natural factors cause crop failures, but human beings cause famines.' While there had been previous famines in Ireland before the Great Famine,<sup>31</sup> none had been so severe and had lasted so long (1845-52). In the first year, 1845, there had been a partial failure of the crop, while in 1846 the failure was total, and this together with a harsh winter (1846/47) brought an epidemic of 'famine fever'. The season of 1847 saw an improvement in that the potato blight, though still present, was now less virulent, but the following year saw a return of total crop failure.<sup>32</sup>

To make matters worse, mass starvation was accompanied by mass eviction, and it is estimated that between 1847 and 1854 over half a million people were evicted, being unable to honour their rent dues.<sup>33</sup>

#### THE RESPONSE OF GOVERNMENT

The British government response was initially prompt and relatively effective during the prime ministership of Sir Robert Peel. When, however, he was succeeded by the Whig prime minister, Lord John Russell, the government's response became increasingly inadequate, because the Whig administration was greatly influenced by the prevailing *laissez-faire* doctrine, which had been expounded by Adam Smith<sup>34</sup> in the previous century, and upon which the trade of the Empire had been built.<sup>32</sup> It would, however, be unfair to put the whole blame on the British government of the day, since Britain had met successfully many earlier appeals for help,<sup>35</sup> and the apparent success of a limited scheme of public works in 1845, together with a restricted government sponsored food distribution scheme, may have lulled the authorities into a false complacency. The unrivalled influence upon government policy of Adam Smith's views with rejection of intervention was regarded by Whig and Tory alike as absolute:<sup>36</sup>

Whoever examines, with attention, the history of the dearths and famines which have afflicted any part of Europe during either the course of the present or that of the two preceding centuries .... will find, I believe, that a dearth never has arisen from any combination among the inland dealers in corn, nor from any other cause but a real scarcity, occasioned sometimes, perhaps, and in some particular places, by the waste of war, but in by far the greatest number of cases, by the fault of the seasons; and that a famine has never arisen from any other cause but the violence of government attempting, by improper means, to remedy the inconvenience of a dearth.

It is only recently that another British prime minister, viz., Tony Blair<sup>37</sup> has stated that the government of the time 'failed the people' while the famine ravished Ireland. Perhaps, if such an official government statement of contrition had been forthcoming earlier, the relationship between the British and the Irish peoples might have benefitted.

#### EVICTED AND EMIGRATION

The consequences of the Famine are still noticeable today. One of its results of major significance was its impact upon the Irish peasant's attitude to emigration,<sup>38</sup> which had previously been viewed as banishment and, after the famine raged, came to be regarded as a form of escape and salvation. In 1847, some 230,000 people emigrated to Australia and to North America, with similar numbers in 1848, while in the period 1849-1852



A full-rigged sailing ship, *The Peru*, used in the emigrant trade, typically taking four to seven weeks to reach America. Illustration courtesy of the Famine Museum, Strokestown Park, County Roscommon.

the average annual emigration was well over 200,000 with a maximum of over 250,000 in 1851.<sup>39</sup> Of the emigrants leaving Irish shores in 1847 about 40,000 died, either at sea or upon disembarkation, while of the 16,000 immigrants to New Brunswick in 1847, one seventh died during that year (Figures 8 and 9).<sup>40</sup>

Public health problems and the quarantine arrangements in place, especially of Grosse Island in Quebec, or of Partridge Island at St John in New Brunswick were indeed dire. This sombre tale of woe is relieved only by the courage and devotion of those who attended the sick under these vile circumstances; for example, of the 26 doctors on Grosse Island, 23 contracted fever, about 40 of the staff died and 19 of the priests caught typhus.<sup>41</sup> The chief emigration officer at Grosse Island, A. C. Buchanan, became seriously ill but survived. It is noteworthy that Canada spent about five times as much on relief of emigrants' problems as did the USA,<sup>42</sup> to which destination many of the healthy and capable settlers later crossed.

Although the statistical data relating to immigration into the USA are imprecise, it is reckoned that about 75% of the immigrants leaving Ireland during this period settled there.<sup>43</sup> Of the immigrants who reached Canada, many of them eventually crossed over into the USA in spite of the barriers which had been put in place to try to prevent them so doing. It was fortunate that at this time there was a high demand in the USA for cheap labour, both in industry and in agriculture, and a 'blind eye' was turned on these illegal immigrants.<sup>44</sup> The Irish emigrants maintained a strong belief that the USA was 'the home of liberty' where downtrodden people might find a new fulfilling and more accommodating lifestyle, so it is somewhat ironic that there was initially more prejudice against them there than in British North America (Canada).<sup>44</sup> As well as a fear that wage levels could be depressed by the arrival of a cheap work force and a distrust of 'Romanism', there was a view that Britain was using the USA as a dumping ground for undesirables and for the poor, and also that the Irish might involve the USA in European politics and thus endanger their traditional neutrality. In terms of domestic US elections, the Irish vote was solidly democratic, and such block-voting brought benefits to the Irish, while their political influence was increased by the fact that many Irish settled in groups in urban areas; for example by 1867 about half a





FIGURE 9

A scene from the *Illustrated London News*, 1851, showing the office of an emigration agent.

million people of Irish origin were settled in the 13 principal cities of the USA, in particular over 200,000 in New York.<sup>45</sup>

The American Civil War, with the Irish participating in the fighting on both sides and with Irish regiments being involved in famous exploits such as at Antietam, at the Bull Run, at Fredericksburg and at Chancellorsville, helped to consolidate the Irish influence; the subsequent widening of the concept of nationality also dissipated much of the remaining anti-Irish hostility.<sup>46</sup> The work of charitable religious nursing orders had a similar effect in decreasing the hostility towards Catholicism. Furthermore, the impressive political capacity of the Irish and their ability to participate in debate and discussion was to play a significant role in American history. This still reverberates down to the present time in successive generations that can be traced back to an Irish heritage.

#### IMPACT OF THE BLIGHT IN SCOTLAND

Scotland was affected by the potato blight in a similar way. In particular, the Highlands and Islands suffered the last great subsistence crisis in the British mainland,<sup>47</sup> but the consequences thereof, while causing serious destitution and threatening starvation, were not on the same catastrophic scale as in Ireland: the number of people seriously affected in Scotland was never larger than 150,000. Professor Devine, in his definitive study of the Highland Famine,<sup>48</sup> puts forward a number of reasons for this difference. First, the Highland landowners were, in general, much more prepared to undertake famine relief measures,<sup>49</sup> and they also made much more use of the financial grants available under the Drainage Act for relief purposes.<sup>50</sup> Furthermore, the affected area in Scotland was located in a maritime environment, and thus an alternative abundant food source was available, as well as enabling relief operations in the Western Highlands and Islands by the use of the recently-introduced steamships which were able to access most areas relatively quickly and in all but the worst weather to supply these areas with food.<sup>51</sup> It is also probable that there was less overall dependence on the potato in Scotland than in Ireland.

The Scottish Famine also occurred in a society which had by the 1840s undergone a significant change in economic structure with industrialisation and urbanisation increasing the employment opportunities (often through temporary migration) and the wealth of the area.<sup>51</sup> Ironically, the Repeal of the Corn Laws in 1846 facilitated the international trade in food<sup>52</sup> which such a richer society could take advantage of.

This new wealth, furthermore, allowed the development of a benevolent 'middle class', able to respond to appeals by the less fortunate for relief, and this philanthropic attitude was encouraged by the evangelical movement in the Church of Scotland,<sup>53</sup> by the romantic picture of the Highlander portrayed in the novels of Sir Walter Scott<sup>54</sup> and in the poems of Ossian, and by the exploits of the Highland regiments. By contrast, the Irish were considered as 'unruly and turbulent' and thus did not register the same claim upon the generosity of the philanthropist.

The pattern of landownership in Scotland differed from that in Ireland in that many of the landowners in the West of Scotland and in the Highlands belonged to families which were not mainly dependent upon the revenue from their estates,<sup>55</sup> such as, for example, James Matheson of the trading firm Jardine, Matheson and Co., who had acquired Barra, South Uist, Benbecula and Lewis. Another important difference lay in the large-scale development of sheep-farms in Scotland,<sup>56</sup> which had by the 1840s already resulted in the formation of larger tenancies and land consolidation with resulting smaller populations: the story of the Clearances.<sup>57</sup>

All of these factors, and more, resulted in an amelioration of the outcome of the potato famine in Scotland, although this is not to underestimate the human suffering that it brought about in the Highlands and Islands.

#### RECENT FAMINES ELSEWHERE

Britain, unfortunately, has been involved in other famines further afield in territories over which it held jurisdiction. The last major involvement of the British Empire in famine, highlighted recently by the televised documentary entitled *Indian Summer*<sup>58</sup> was the disastrous famine of 1943-44 in Bengal (what is now West Bengal and Bangladesh) where a combination of a relatively mild food shortage together with political priorities in the context of a savage war against Japan, resulted in three million deaths due to starvation. The British government was also involved with the problems of mass starvation experienced at the end of World War II, which earned major criticism at the time.<sup>59</sup>

More recent famines include those in China (1958-62), Ethiopia (1973-74), the Horn of Africa (1984-85), and Somalia (1992), as well as the current position in South Sudan, and it is clear that this age-old tragedy is still with us as the end of the second millennium approaches. It is not without justification that famine remains one of the four Horsemen of the Apocalypse. It should not be forgotten that Europe was also a continent that suffered repeated famines.<sup>60</sup> Lasting peace, international co-operation and general good-will are needed to vanquish this catastrophe.

#### Chronology of the potato famine in Ireland.

1785-1825	Population of Ireland doubled to eight million.
1845	Potato blight caused a loss of more than a third of the potato crop.
1846-1847	Disruption in planting, shortage of seed potatoes leads to less than a quarter of the usual harvest.
1849	Again, only one third of the usual potato harvest.
1880s	Copper sulphate spraying on the stalks of the potato plants prevented invasion by fungal spores. This, together with the introduction of new varieties (e.g. Champion), meant that control was gained over the epidemic.

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