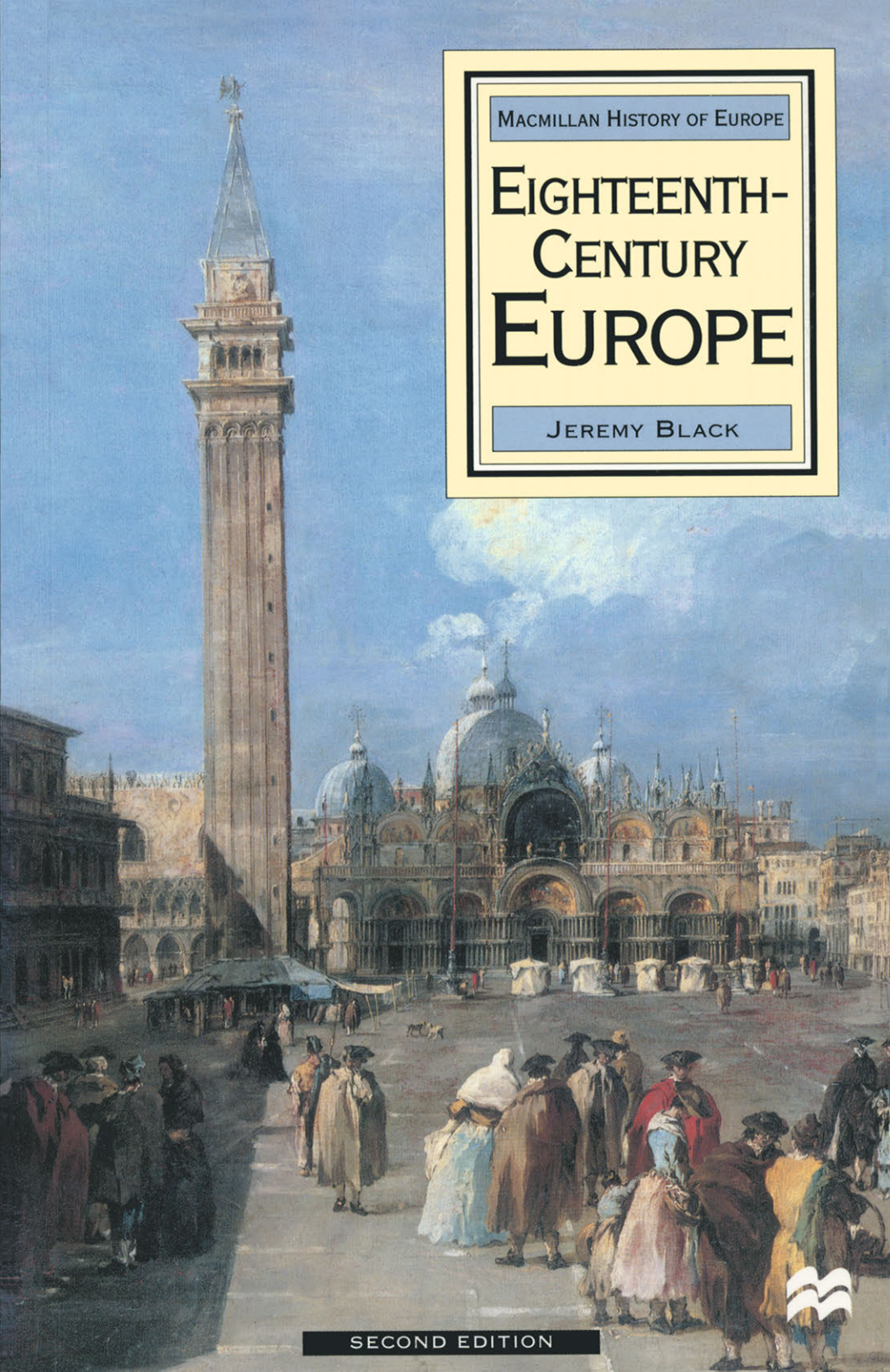
MACMILLAN HISTORY OF EUROPE
EIGHTEENTH-CENTURY EUROPE
JEREMY BLACK
SECOND EDITION

Macmillan History of Europe

Eighteenth-Century Europe

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Eighteenth-Century Europe

Jeremy Black

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To Robert Baldock
a friend whose wise counsel
I appreciate as greatly as
I enjoy his company

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(Regency of duke of Orléans	1715–1723)
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Frederick II of Prussia is referred to in the text as Frederick the Great to distinguish him from Frederick II of Hesse-Cassel.

Preface to the Second Edition

'Not enough on Rousseau. Too much on Russia.' 'Too much on Russia. Not enough on Rousseau.' If it is impossible to write a general work that will satisfy all, that has become even more the case as the scholarly agenda has widened. It is no longer acceptable to offer simply what one scholar unfairly reviewing an earlier general work on this period referred to as 'comfortable old chums like "The Rise of Great Britain", "The Decline of the Dutch Republic" and "The Emergence of Prussia"'. The selection of material entails the risk of bias. How is the teleological challenge posed by the French and industrial revolutions to be faced? Is what happened in Prussia more important than developments in Piedmont? As there are no obvious criteria by which such questions can be answered those interested in this period can benefit from the varied approaches of different scholars. This book is thematic rather than chronological or national in its organisation. For those who prefer the latter approaches there are a number of excellent surveys available.

I owe thanks to a number of institutions and individuals. By asking me to produce an expanded edition of this book Jonathan Reeve provided me with the opportunity of undertaking a very interesting project. Two chapters are entirely new and all the others have been extensively revised. My research was helped by those institutions which, in supporting foreign archival work, gave me the opportunity to work in libraries after the archives were shut. Furthermore, the book benefits from my work in Austrian, British, Dutch, French, German and Italian archives since 1978. The use of original examples enlivens this study and, more significantly, a grounding in eighteenth-century archival sources has provided a grasp of the uncertainties and compromises of the period. This contributes to a feature of this book, an emphasis on the difficulty of offering sweeping explanations. Instead, there is a stress on the contrasts of the age, the variety of developments and the complexity of analysis. In place of traditional preconceptions and easy explanatory antitheses, such as despotism and revolution, *ancien régime* and new order, privilege and protest, tradition and progress, stability and strife, liberty and order,

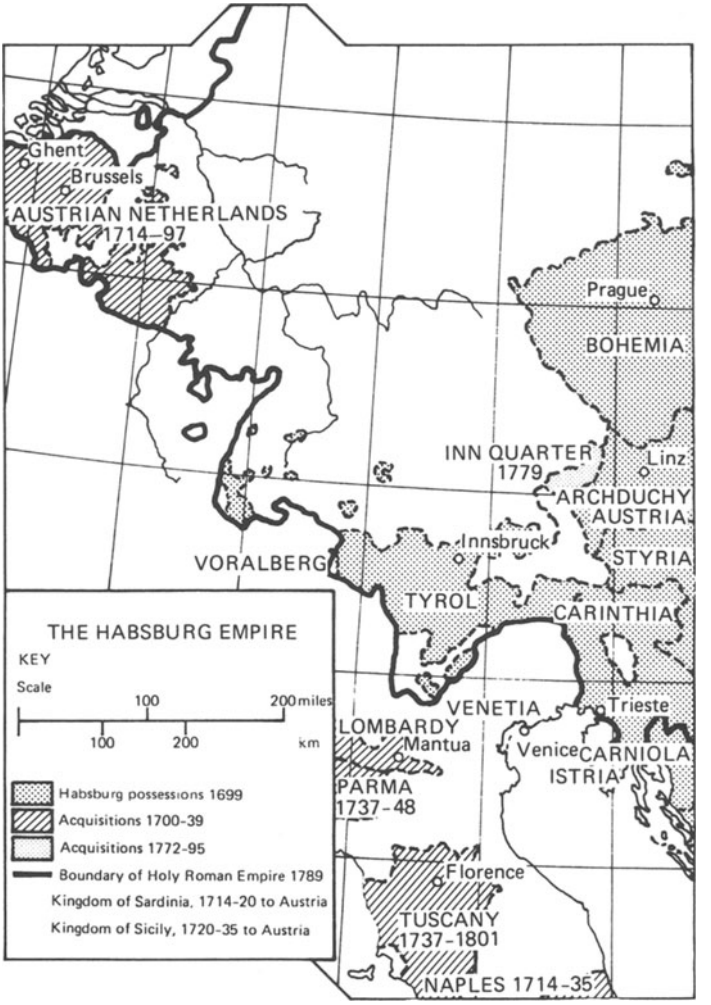
authoritarianism and affection, high and low culture, there is a concern with detail in order both to show the vivid concreteness of the age and to suggest interaction as well as tensions within the eighteenth-century world. There is also a stress on the protean, adaptable character of the old order.

Wendy Duery provided crucial secretarial support. Matthew Anderson, Nigel Aston, Edward Corp, Malcolm Crook, Bill Gibson, Sheridan Gilley, Jan Glete, Nick Henshall, Murray Pittock, David Sturdy and Peter Wilson helpfully discussed aspects of the new edition, which was written in the summer of 1998. The preface to the last edition closed: 'The book was begun in 1983, two homes ago. I thank Sarah for everything.' Now, it should read three homes. The thanks are the same.

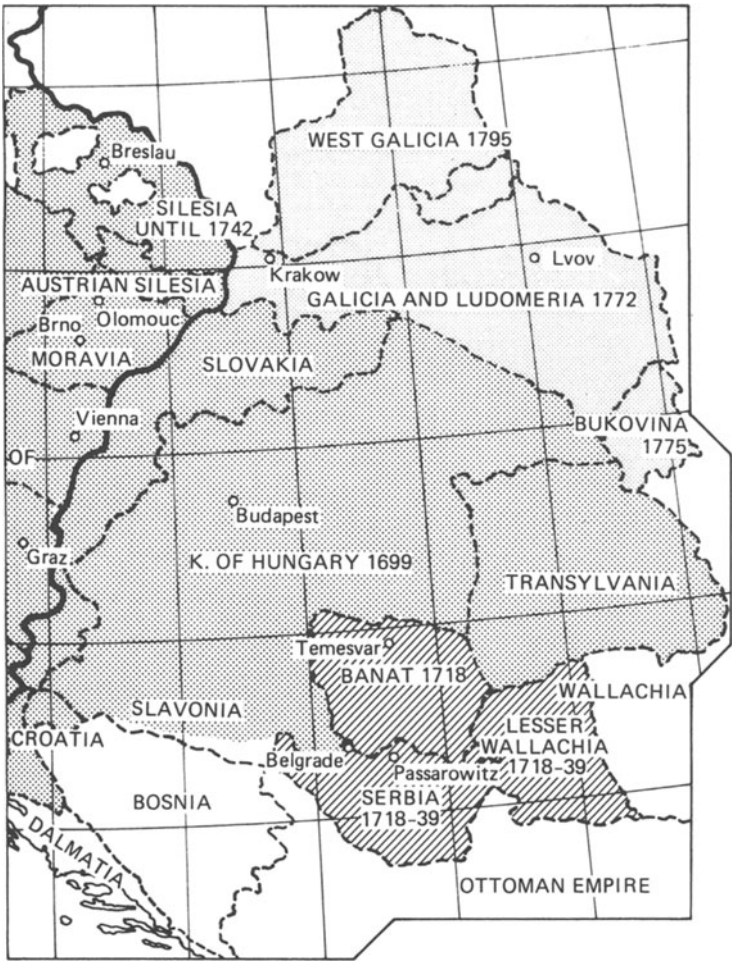
JEREMY BLACK

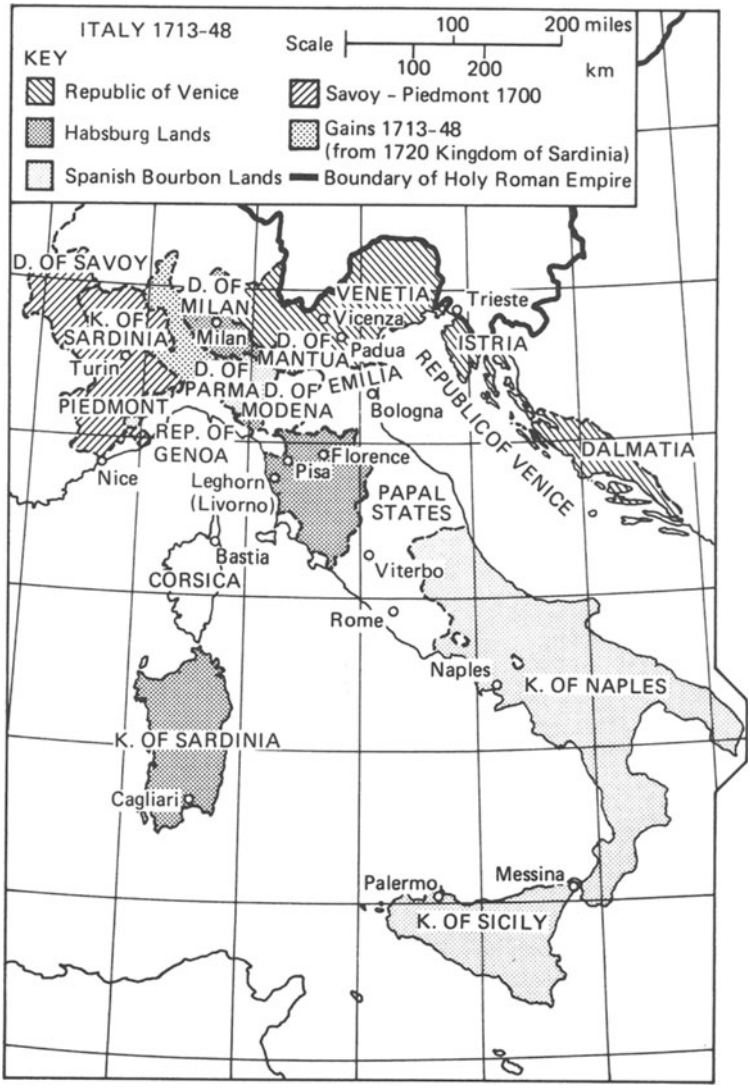
Map 1 Europe 1700


FINLAND
INGRIA
Stockholm
ESTONIA
Moscow
LIVONIA
COURLAND
RUSSIA
LITHUANIA
POLAND
UKRAINE
GALICIA
HUNGARY
MOLDAVIA
Crimea
TRANSYLVANIA
WALLACHIA
Constantinople
MONTENEGRO
NAPLES
OTTOMAN EMPIRE
MOREA



Map 2 The Habsburg Empire


WEST GALICIA 1795
Breslau
SILESIA
UNTIL 1742
Krakow
Lvov
AUSTRIAN SILESIA
GALICIA AND LUDOMERIA 1772
Brno
Olomouc
MORAVIA
SLOVAKIA
Vienna
BUKOVINA
1775
OF
Budapest
Graz
K. OF HUNGARY 1699
TRANSYLVANIA
Temesvar
BANAT 1718
WALLACHIA
SLAVONIA
CROATIA
LESSER
WALLACHIA
1718-39
Belgrade
Passarowitz
BOSNIA
SERBIA
1718-39
DALMATIA
OTTOMAN EMPIRE



Map 3 Italy 1713–48

Map 4 France in 1789

1 Hostile Environment

There is an unphilosophical story of a woman brought to bed the other day at Paris of two young lions after having been to see a lion baited; that is believed at court, and generally through all France, and will probably make as great a noise as our rabbits.

(Robert Trevor, Haute-Fontaine, 1729, referring also to the belief that Mary Toft, a Godalming woman, gave birth to rabbits)[1]

The lives and activities of individuals of all social groups were governed in Europe by a hostile environment. Many of the difficulties are still familiar today, particularly in the Third World, but modern familiarity with such problems as disease or adverse weather conditions should not blind us to their significance. They affected not only the experiences and actions of individuals, but also their attitudes, and it is necessary to consider the latter in order to understand the impact of facts of life and death.

Demography, disease and death

The pre-modern demographic (population) pattern was usually static, and essentially procreation-postponing, with low illegitimacy, and with late marriages linked to job opportunities. However, the general movement in population in eighteenth-century Europe was upward, particularly after the early 1740s. The European population rose from about 118 million in 1700 to possibly 187 million a century later. As with so much in a period for which diversity was the keynote, this general increase concealed significant variations, in terms both of the rate of growth and of its chronology. Unfavourable demographic and economic regimes could produce a decline in population, as could catastrophes such as serious warfare. In such circumstances the fall in population often owed much to emigration and, in the case of towns with death rates higher than their birth rates, to a failure to sustain immigration. In a century when the availability and accuracy of statistics were, and are, limited, most population figures should be taken as approximate. Nevertheless, there are clear signs of a drop in some areas. The Danubian principalities, Moldavia and Wallachia, now in modern Romania, suffered a substantial decline that owed much to repeated wars between the Turks and

the Christian powers and to emigration. War also helped to reduce the population of the electorate of Saxony from 2 million in 1700 to 1,600,000 at the end of the Seven Years War in 1763, a war that had cost Prussia, through death and flight, 10 per cent of its population. In contrast, despite being besieged and captured, Antwerp owed its population decline from 67,000 in 1699 to 42,000 in 1755 largely to adverse economic circumstances, as did Ghent.

Stagnation characterised the population figures of many areas for much of the century. The population of Rheims was stable at 25,000 from 1694 until 1770, before beginning a period of growth that was to take it by 1789 to 32,000, but that was only a return to the figure for 1675. At a smaller scale, also in France, the population growth in the community of Duravel in Haut-Quercy was insufficient by the end of the century to reach the figures that had preceded the 1693 famine. Economically stagnant Venice, bereft of the trade that brought prosperity to so many Atlantic ports, had a population of 138,000 in 1702, 137,000 in 1797. Stagnant population figures were not necessarily a problem. It could be suggested that, in part, a stable population reflected a desire to benefit from higher per capita incomes by limiting population, as much as a response to poor economic conditions. Many areas that witnessed population growth, such as the Dutch province of Overijssel and Ireland in the second half of the century, encountered difficulties.

Nevertheless, the general trend was for a rise in population, and this affected both areas that were clearly experiencing significant economic growth and others that were not. In the latter category, the population of the kingdom of Naples on the mainland nearly doubled to over 5 million, that of the island of Sicily rose from 1 to 1.5 million, while the Portuguese figures rose from 2 to 3 million and those of Norway from 512,000 to 883,000. Economic activity was not the sole factor. Territorial gains, especially from Poland in 1772–95, helped to push Russia's figures from 15 million in 1719 to 35 million in 1800, a figure that put her ahead of France whose population had risen, again partly due to annexation, from 21.9 million in 1675 to 22.4 million in 1705, 24.6 million in 1740 and possibly close to 30 million in 1800. The latter rise again illustrated the diversity of the age, for it concealed both periods and areas of slack growth, such as the 1740s, 1780s, and western France, and others of marked increase, such as Burgundy and Alsace. Elsewhere in Europe, the population of Poland began to rise in the 1720s, after a period of war and epidemics, while that of the German duchy of Württemberg rose from 428,000 in 1734 to 620,000 in 1790, although this increase

was exceptional within Germany and does not reflect the less dramatic overall trends. The process of population growth in Spain accelerated after 1770, but most of the eighteenth-century growth occurred in peripheral and coastal provinces such as Valencia, rather than in the poorer agricultural central regions. Discrepancies in growth rates become more marked as the range of geographical focus narrows and, in particular, as the towns are considered. Though the Italian population rose from 13 to 17 million during the century, that of Turin, a government centre (for Piedmont) with little industry, rose from 44,000 to 92,000. Urban growth was greatly dependent on immigration. While the general rate of increase in the Rhineland over the century was 30 per cent, the population in Düsseldorf and the nearby villages doubled between 1750 and 1790 thanks both to a higher birth rate and to immigration. Berlin, the capital of Prussia, witnessed a jump from 55,000 in 1700 to 150,000 in 1800.

Detailed variations in population movements provide some clues to the reasons for change at the same time as they make a general thesis more difficult to devise. Birth control, including higher ages of marriage, restricted the numbers born, disease and malnutrition were the principal limiting factors thereafter. The average age at which women married for the first time, a crucial source of differences in demographic growth, varied greatly, but there are signs that it reflected an awareness of economic opportunity. In eastern Europe, where population densities were low, labour was generally in demand and overpopulation was less of a problem, the age was commonly 17–20, and most women married. The contrasting figure for north-west Europe, with its higher densities and population pressure, was 23–27.

Economic adversity structured demographic activity, creating and altering norms of behaviour and producing great pressure on individuals. In the Tuscan village of Altopascio the average age on marriage rose from 21.5 prior to 1700 to 24.17 between 1700 and 1749, and was matched by a decline in the average number of children per couple. This probably owed much to the depressed incomes that paralleled the fall in the price of wheat at the beginning of the century. The adverse economic situation in the village of Bilhères in the French province of Béarn, a community whose population pressed on its limited food supplies, helped to produce an average age of women at first marriage of 27 and very few remarriages. The comparable figure between 1774 and 1792 in the village of Azereix in the French Pyrenees was 26 and the average gap between births was long, suggesting contraceptive practices. The slight decrease in the French birth rate after about 1770 has been attributed in part to the latter,

particularly coitus interruptus. A Church conference on marriage in 1715 had insisted that women must perform their conjugal duties, but it was left to the parish clergy to try and enforce it. Sermons dwelt on the theme. There are signs that more enlightened priests by the 1770s were handling these awkward moral issues with a new sensitivity, tacitly allowing contraceptive practices. As the prosperity of the Austrian Netherlands declined towards the end of the century, the marriage rate fell.

There are therefore clear signs that birth rates were in some areas related to an awareness of economic opportunities. Until the late 1760s marriage rates at Strasbourg followed the movement of prices. The cycles in the silk industry of Krefeld in the Rhineland were mirrored in the local marriage figures. The 1755 census in Brabant revealed that the marriage age for peasants was later than that for artisans, who generally had greater possibilities for earning money and achieving independent status earlier in life. Economic opportunities could lead to significant increases in population, due to immigration, higher birth rates or both. The rise of the British population has been attributed to a lower age of marriage and more fertile marriages rather than to a declining death rate, and the former may owe much to rising real wages, as in Yorkshire. The population of England and Wales, in millions, rose from 5.18 in 1695 to 5.51 in 1711, 5.59 in 1731, 6.20 in 1751, 6.97 in 1771 and 8.21 in 1791. The population of Castres in France rose 50 per cent between 1744 and 1790 in response to the recovery of the town's textile industry. It has been suggested that proto-industrialisation, the development of industrial activity in certain rural areas, led to demographic growth in these areas. These areas then in effect used their wealth to export their malnutrition to the peasantry of agricultural regions, such as Hungary and Galicia in eastern Europe, by importing food from them.[2]

However, population growth was not simply a matter of rising birth rates reflecting economic growth. Population did not only rise in areas of such growth, and it has been argued that a declining death rate was a more significant feature of the European demographic regime. Life expectancy was not high by modern European standards. In the Bohemian town of Pilsen, the rate of deaths prior to a fifth birthday was 52 per cent, but towns were particularly unhealthy. The comparable figure for the Moravian village of Poruba was 36 per cent, but this was still harsh. The mean age of death in Poruba in the first half of the century was 27 for men, 33 for women, figures that improved to 54 and 55 for those who survived to 15: surviving childhood was the key to

achieving a reasonable age. In the second half of the century the figures were actually worse, due to the famine of 1772.

Even where they occurred, increases in average life expectancy could not counter individual fear, particularly given the readily apparent fallibility of contemporary medicine. The situation was harsh at both ends of the social scale. Frederick II (the 'Great') of Prussia succeeded his father Frederick William I in 1740 because his two elder brothers had died, both before the age of one. Three-quarters of the infants left at the Hospital of the Innocent in Florence in 1762–4 who were not reclaimed by their parents died before reaching adulthood. The comparable figure for the General Hospital of Amiens in the 1780s was two-thirds dying by the age of five. Institutionalisation helped infection. In Walloon Brabant, part of modern Belgium, 20 per cent of those born died in their first year, and the life expectancy was less than 40. Nevertheless, the population still rose, and at an annual rate of 0.69 per cent in the second half of the century.

The plague

Disease was a significant killer both as a constant presence and through dramatic epidemics. Plague could have a terrifying impact. The plague epidemic that began in the late 1700s decimated the population of eastern Europe. Hungary lost about 10 per cent of its population, Livonia over 125,000 people. It also disrupted economic, political and cultural activities, bringing closures such as the Austro-Hungarian frontier in 1709–14 and the university of Königsberg in 1709. A plague epidemic that ravaged the Ottoman Empire, Hungary and the Ukraine in the late 1730s and 1740s killed about 47,000 in Sicily and Calabria in 1743. A savage epidemic at the beginning of the 1770s affected Russia and the Ottoman Empire. Over 100,000 people died in Moscow, where rumours spread that doctors, secretly in alliance with the nobility, were spreading the disease instead of fighting it. In Kiev, where 18 per cent of the population died, the obscurantist clergy refused to approve the burning of the clothes of the dead, a necessary measure in order to fight the disease.

In one perspective, the plague was in retreat. In Scotland the last major epidemic ended in 1649, in England in 1665, in Spain in 1685, in France in 1720, and in Italy in 1743. The situation looked less favourable, however, in eastern Europe, where significant epidemics affected the Balkans in the 1710s, 1720s, 1730s, 1740s, 1770s and 1780s. Furthermore, the general attitude was one of fear and vigilance not optimism. Europe was bisected by a plague

cordon, a network of quarantine officials, posts and regulations that were intended as a barrier to resist the effects of the hostile environment. It was most apparent on the European borders of the Ottoman Empire. Vigilance, always constant, rose to a frenzied pitch during epidemics. Venice sent warships into the Adriatic to prevent the arrival of ships from infected areas in 1743 and that winter prohibited trade with the rest of Italy. Her regulations did not respect rank and the duke of Modena was forced into quarantine. In response to epidemics, troops were used to close frontiers in eastern Europe, as in 1753 and 1770, and naval patrols were established off the Neapolitan coast in 1778. Western Europe was not free of anxiety. An outbreak of fever in Rouen in early 1754 was falsely identified as plague, and three years later the disease was reported at Lisbon. In 1781 the Sardinian government took major precautions to prevent the spread of plague from the Balkans.

The potential effectiveness and ruthlessness of eighteenth-century measures for the control of the plague were well demonstrated in the moves to limit the spread of the Marseilles outbreak of 1720. Without the *cordon sanitaire* which isolated the city in 1720 the epidemic might rapidly have spread throughout France. Quarantine regulations were arguably the government activity that was of most benefit to the people of Europe, but, as with so many other aspects of state activity, their effectiveness is difficult to assess. The practice of quarantine was well-founded, since, if isolation could be achieved, the chain of infection would be broken.

However, eastern Europe lacked the bureaucracy to police the disease effectively, and it is arguable that public health measures were less significant in limiting the outbreaks of plague than mutations in the plague parasite and changes in its more common hosts, the rat and flea population of Europe. Barriers against disease were flimsy, and reactions to it clumsy and erratic, due to prevailing attitudes and the limited nature of medical knowledge. It is possible that the chances of infection in western Europe were reduced by the alterations in human habitat characterised by construction with brick, stone and tile, for example the move away from earthen floors, although these remained common in the dwellings of the poor. Whatever the causes of the change in western Europe, they were of no comfort to the peoples further east, where plague neither disappeared nor diminished in virulence. In the Ukraine, and Russia more generally, bubonic infection came from ground-burrowing rodents, and the spread of agriculture southwards led to increased occupation of lands occupied by these rodents. However, ploughing also restricted the natural habitats of the rodents, and, thanks in part to the greater availability of food, the population rose.[3]

The fight against smallpox

The plague was by no means the only serious human disease, although the quantification of disease patterns is hindered by the imprecision of many eighteenth-century medical terms. Decline and palsy were really conventional terms for symptoms preceding death, while ague and flux were very imprecise labels, diagnosed with an unknown extent of variability. Smallpox was a serious killer, especially of children, and was responsible for mortality crises in Milan in 1707 and 1719 and in Verona in 1726. It was endemic in Italy in the 1750s and in Venetia in the early 1760s, and was the principal killer of infants in Vienna in 1787. It was also no respecter of rank. Pedro II left Lisbon for the countryside in January 1701 in order to avoid it. Louis XV died of it in 1774 and three years later it claimed the king of Naples' brother, leading the monarch to have his children inoculated.

The disease was difficult to conquer. Resistance to inoculation against smallpox, frequently on the grounds of tempting divine providence, was not always uninformed. The Reverend Norton Nicholls wrote from Rome in 1772, 'The smallpox has raged like the plague here and made dreadful havoc. They are much prejudiced against inoculation, and have a ridiculous notion that the disorder may return again so, but not after having had it in the natural way.'[4] In fact, the spread of inoculation in Italy after 1714 might be related to the higher frequency of smallpox, as inoculated persons, when not isolated, were a source of infection. Inoculation in Britain became safer after the Suttonian method of inserting only the smallest possible amount of infectious matter was widely adopted from about 1768. Vaccination, rather than inoculation, played a major role in defeating smallpox, but it was not first performed, by Edward Jenner, until 1796. It was introduced into France in 1800 and it has been estimated that within a decade 50 per cent of French babies were being vaccinated.

Other diseases

Typhus, typhoid and relapsing fever were endemic in Europe and could become epidemic. Influenza was a serious problem, with major European epidemics, as in 1733, 1742–3 and 1753. Bacillary dysentery was always common in rural Europe and the primitive sanitation and poor nutrition of the period helped to make the disease a killer. Epidemics of dysentery had savage effects in France in 1706 and the Austrian Netherlands in 1741; another, known as the Red Death, affected the Low Countries in the 1770s. In Sweden pulmonary tuberculosis was endemic from the mid-century, and the 1770s and 1780s were periods of severe

crop failures and dysentery epidemics. Malaria was a significant problem in certain Mediterranean areas, such as the island of Sardinia, while syphilis was another common disease. The absence of antibiotics and the limited use of condoms ensured that venereal disease was a constant concern of the period. In addition, a whole host of illnesses and accidents that in modern Europe can be tackled successfully were killers.

In 1768 an allegorical ballet entitled *Prejudice Overcome* was staged at the Russian court. Two opposing temples, of Ignorance and Aesculapius, the god of medicine, were presented alongside a character Ruthenia, representing the Russian people, worrying about smallpox. Minerva, symbolising the Russian ruler Catherine the Great, who had herself been recently inoculated, emerged from the Temple of Aesculapius and agreed to be inoculated, whereupon Ruthenia followed and a dance of hope began, celebrating the expulsion of Superstition and Ignorance, two characters in the ballet, from the kingdom. Reality was otherwise. The trickle-down theory was limited by a lack of interest from many rulers, such as Catherine herself, in the situation of the people, and by popular resistance to new ideas, whether the attempt to prevent burial inside churches in Brittany or to implement the sanitary reforms devised by the government of the Austrian Netherlands in 1779. Church authorities often failed to provide new consecrated burial grounds.

Nevertheless, there was a greater understanding of some of the problems that contributed to disease. A French royal declaration of 1776 declared that cemeteries in built-up areas that endangered 'the salubrity' of the air must be moved wherever possible, and that only bishops, priests, patrons and seigneurs could be buried inside churches. Town planning revealed a preference for public spaces that were ordered, airy and well lit. French plans for the ideal market sought to offer air, space and water, to consider the physical safety of customers, the control of smells and the cleanliness of the building. It is possible that some success in the struggle against disease should be attributed to the efforts of local institutions, whether by providing more hospitals, supplying clean water or, as with the Basque Society of Friends of the Country after 1771, campaigning in favour of inoculation against smallpox.

The virulence of eighteenth-century diseases, however, was also a product of the circumstances of the age. Trade and migration spread them. In 1730 a Spanish squadron from the West Indies brought to Cadiz the first European cases of yellow fever. Armies were mass transmitters and victims of illnesses, helping bridge different disease regions and thus exacerbating problems in areas

with limited immunity to particular illnesses. The diseases that raged in the Russian camp at Narva in 1700 infected the Swedes when they seized it. Austrian troops brought illness to the Upper Palatinate in 1752 and from Hungary to Silesia in 1758, while the Russian troops operating in the Balkans during the 1768–74 war with Turkey spread typhus to Russia. In addition, migrants seeking food or work were widely regarded as a source of infection. This helped to encourage a hostile response to them. The Bavarian envoy in Vienna wrote in 1772 of the Bohemian poor bringing death on their lips.

Sanitation and diet

Sanitation and diet were clearly problems. The housing conditions of the bulk of the population, in particular the habit of sharing beds, were conducive to a high incidence of respiratory infections, an apparent consequence of the lack of privacy that was produced by the limited nature of the housing stock. Sanitary practices and standards of personal cleanliness were important, particularly in communities with a high density of population. Louse infestation was related to crowding, inadequate bathing facilities, and the continual wearing of the same clothes. Cleanliness was associated with wearing clean shirts and linen, rather than washing, but both were only possible for a minority. There were few baths or lavatories. Whatever their wealth, humans had few defences against a whole range of the natural world from lice, bed-bugs and fleas to tapeworms.

The habit of washing in clean water was perforce limited, while the proximity of animals and dunghills was unhelpful. Europe was a society that conserved rather than disposed of its excrement. Animal and human waste were gathered for purposes of manure. This manure stored near dwellings was dangerous and, once spread, could contaminate the water supply. Effluent from undrained privies and animal pens flowed across streets and on and beneath the surface into houses through generally porous walls. Typhus was one result. Clean drinking water was absent in most of Europe, particularly in large towns, coastal regions and lowland areas without deep wells. River water was often muddy while pump water could be affected by sewage. This accounted for the importance of fermented drinks.

Poor nutrition also contributed to the spread of infectious diseases, by lowering resistance. Furthermore, malnutrition limited sexual desire and activity, hindered successful pregnancy, and, if chronic, delayed sexual maturity and produced sterility in women. Problems of food shortage and cost ensured that the bulk of the

population lacked a balanced diet, even when they had enough food. Diet varied by area and social group and substitution was possible; for example, in Russia fish, berries and honey could provide nutritious substitutes for meat and sugar. In general, fruit and vegetables were expensive and played only a minor role in the diet of the urban poor, who were also frequently ill-clad. Much of this group was affected by declining real wages as prices rose and a larger population led to labour surpluses.[5] The European peasantry consumed little meat and ate the less desirable cereals.

In some areas there are signs of a deterioration in the diet. In Austria, per capita meat consumption fell in the second half of the century. In Sweden the quantity of animal products consumed per capita fell. Evidence from military archives on the height of Bohemian, Hungarian and Swedish males suggests that boys growing up towards the end of the eighteenth century suffered some degeneration of health and nutrition and that their growth was inhibited accordingly.

Poor hygiene and nutrition appear to have played a major role in the spread of epidemics. In Strasbourg until the 1750s periods of food scarcity were accompanied by epidemics. Hunger was associated with dysentery in the Brabant countryside. Across much of Europe the rise in cereal prices in 1739–41 was followed by an upsurge in epidemic diseases; although this also coincided with very bad weather. The Italian famine of 1764–8 may have been responsible for the fever epidemic that hit central Italy in 1767. Conversely, in the late eighteenth-century Rhineland, good harvests were matched by a relative absence of epidemics.

The impact of disease was not solely affected by nutrition. Climatic factors were also of great significance, particularly in weakening resistance. Epidemics of fatal respiratory disease became rife in France during the early 1740s, probably due to hypothermia. Savage climatic conditions were exacerbated by shortages of firewood and by the damp, cold, cramped and insanitary nature of much accommodation. Nevertheless, the state of the food supply was clearly of major significance, not only in preventing famine, but also in affecting general health and morale.

Famines

Famines could bring massive mortality, about a quarter of the Finnish population in 1696–7. Nearly a quarter of a million people died of starvation and disease in East Prussia in 1709–11. Famine led to a sharp rise in the death rate in Bari, Florence and Palermo in 1709 and in the kingdom of Naples in 1764. The last led Ferdinando Galiani to write *Dialogues sur le commerce des blés*

(1769), a strong attack on free trade in grain. In 1771–2 about 170,000 people, 7 per cent of the population of Bohemia, perished in a subsistence crisis. The local impact could be savage and prolonged. The number of deaths registered in the French town of Albi jumped from 280 in 1708 to 967 in 1710, the births slumping from 357 to 191 and the marriages from 100 to 49. Recovery was slow. Economic activity remained low, municipal debts high and houses abandoned. By 1750 Albi had still not regained its population of 1700. Not all famines had such dramatic effects, but they could serve to exacerbate the impact of disease. The bad Swedish harvests of 1717 and 1718 led, in regions where both salt and flour were in short supply, such as Dalecarlia, to illnesses connected with undernourishment, causing a sharp rise in the death rate. In Tournai in the Austrian Netherlands the famine of 1740 led to few deaths, but paved the way for the virulent epidemic of 1741.

It is unclear how far the general rise in the European population in the eighteenth century was due to success in the battle with famine. This battle took two principal forms, an increase in agricultural production, and communal and government attempts to improve the distribution of food and to deal with the direct effects of famine. Aside from the general conviction that the strength of a state was relative to the size of its population, a conviction that reflected the importance of numbers for both the army and agricultural work, famine was also a serious political issue. It often led to riots, whether in Istria in 1716, Paris in 1725, the United Provinces in 1740, England in 1766, Normandy in 1768, Palermo in 1773, Ireland in 1778 or Florence in 1790. In Paris in the 1750s seditious comments often cited the high price of bread and the general misery of the people as reasons why Louis XV should be killed. Fears of famine prompted popular disturbances in the Austrian Netherlands in 1767–9 and 1771–4, revealing popular alertness to rumours of famine. The widespread nature of such disturbances helped focus the concern of governments and political writers on the food supply. In addition, poor harvests seriously disrupted economies and threatened revenues by reducing the potential tax yield and focusing consumption on the supply and price of bread.

There are signs of an improvement in the situation during the century. In 1740–2 Scandinavia and Ireland were the sole regions where mass famines occurred. Elsewhere, public welfare and relief programmes served to limit deaths, despite food shortages and a rise in cereal prices. The possibilities for effective government action were revealed in Prussia. A network of royal granaries already existed, and despite a bad harvest, the onset of war (the

War of the Austrian Succession) and adverse climate, the Prussian government proved reasonably successful in preventing increases in destitution and unemployment, itinerant vagrancy and riots.

The Prussian system remained effective for the rest of the century. The grain stocks available in the public granaries, the grain policies of Frederick the Great, and the social control exercised by landlord and government minimised the social responses to dearth, such as migration, that helped to cause higher mortality figures. The Prussian government believed in preparation and firm action to deal with food shortages. A general edict in November 1740 called upon all nobles and lessees of crown land to sell their grain stocks in the markets within two weeks on pain of confiscation, at a price set by the government. In 1770–1 the effect of crop failures in East Friesland, a Prussian possession from 1744, was limited by the use of the royal depots. Frederick's system acted as a model for Hesse-Cassel, and helped minimise the extent of starvation arising from the serious crop failures of 1770–1.[6]

There were also significant improvements in Denmark. Before the 1770s the Danish annual death rate had displayed very wide variations, partly due to epidemics and limited resistance following crop failures. The Danish agrarian reforms brought a general rise in the standard of living, including new and better housing. From the 1770s mortality figures fell alongside a certain levelling out of variations in the number of deaths, although significant rises linked to epidemics continued to occur.

Public action to counter disease and famine was taken in much of Europe, particularly in cities, the location of most acute food-supply pressures and the places where disturbances were most serious. It was, however, easier to issue regulations or construct edifices, such as granaries, or the Aqueduct of Free Waters for Lisbon built between 1729 and 1744, than to establish comprehensive relief systems or alter attitudes. By 1740 public granaries had been built in Besançon, Lyons, Marseilles and Strasbourg, but most of the French population was still exposed to grain shortages. In addition, the terrible Italian famine of 1764 revealed the inadequacies of public relief and provisioning systems in the peninsula.

The food supply

Success in combating famine was not simply due to public initiatives. There was also a significant improvement in agricultural production. In Brabant, a province in the Austrian Netherlands where the population doubled between 1709 and 1784, the potato

was introduced towards 1710 and after 1740 was spread widely. By the second half of the century, famine there did not lead to significant mortality, and life expectancy was higher. The introduction of maize in Altopascio in Tuscany in 1710 may have been responsible for the weakening of the mortality crises there after 1717. The supply of foodstuffs into Copenhagen indicates that a distinct improvement in nutrition took place during the 1750s, whether reckoned according to the quantity of calories or of proteins. From the 1780s, potatoes began to be introduced there. In Burgundy and Picardy in France there was both agricultural improvement and a rise in population. Ireland suffered massively in 1741, though it was able to absorb population pressure later in the century due to increased reliance on the potato. Expanded international trade in food may also have helped in the tackling of subsistence crises. Improved medical provision may also have been a factor, particularly in the towns. The rise in the birth rate and decline in infant mortality in Strasbourg may have owed something to improvements in midwifery. However, as the real killer of babies was puerperal fever, whose cause was not understood until the following century, it is not surprising that medical provision appears to have had little effect on infant mortality.

In other regions the situation was less favourable. In south-western France major subsistence crises in 1746–8, 1769–72 and 1785–9 helped to weaken the population and to ensure that during the major epidemics of 1772 and 1787–9 death rates exceeded birth rates. In much of the region there was no surgeon and the sick had to rely on the priests. Similarly there was no new demographic regime in the Languedoc area of southern France. In the French Pyrenees there was no sign of an agricultural revolution. The diffusion of the potato was very slow; though found in the market of Foix from 1778, it was not sold officially in that of Tarbes until the 1790s. There were regional demographic crises in 1746–7, 1759 and 1769. In the town and hinterland of Ussel in the Massif Central in France the economy remained depressed and there was no increase in population. A high rate of infant mortality was combined with serious crises of mortality which produced a high incidence of broken families. In Duravel in the Quercy region of France the cultivation of maize had spread in the first half of the century, but after 1765 the good agricultural lands had been exhausted and, as the limited agricultural techniques did not allow any increase in production by more intensive cultivation, food shortages became a serious problem. In the 1760s deaths exceeded baptisms and the demographic situation remained poor until the spread of the

potato early in the next century. In the Rhineland town of Koblenz, despite peace from 1763 to 1792, there was little sign of a good late eighteenth century replacing an unfavourable earlier period, as there was in some other regions. Agricultural production failed to match the pressure of Koblenz's population. Despite the good will of the authorities, progress in hygiene was limited and the old town, where the artisans lived, remained particularly unhealthy.

More generally, the persistence of disease ensured that weak sections of the community remained especially vulnerable. There was only a slight decline in the high infant mortality figures in the suburbs of Bologna. In the poor quarters of Toulouse, birth and death rates were high and many children were abandoned. In contrast, in the wealthier centre of the town, a new and more favourable demographic regime developed with lower birth and death rates. Similarly in Geneva and Rouen the mortality rate among the children of the local notables was lower than average. In the village of Rosny-sous-Bois near Paris poorer families had higher mortality rates for both infants and adults than their wealthier counterparts.[7] Subsistence crises were not simply the result of exceeding the amount of food available, but also had their roots in the unequal distribution of resources, and in the limitations of governmental action.[8]

Conclusions

Although in some areas and among certain groups there were moves towards a more favourable demographic regime, this was by no means general. Famine remained a constant fear and a continual preoccupation of government. In many areas the quantity of surplus foodstuffs was slight and the balance of subsistence could be wrecked by any sudden adversity. This was most likely to take the form of severe climatic developments, or the military moves, such as the build-up of Austrian troops in Hungary in late 1787, that led to food shortages and fears of a famine. The generally peaceful conditions in western, central and southern Europe between 1763 and 1792 may have played a significant role in helping the growth of population. In contrast, areas that experienced serious warfare tended to face demographic crisis, not so much because of deaths in combat as because of the spread of infection, the seizure and destruction of crops and the disruption of the rural economy caused by flight and requisitions, particularly of draught animals and seed corn. Between 1695 and 1721 around 60–70 per cent of the population of Estonia and northern Livonia died as a consequence of disease and the

Great Northern War of 1700–21. War also hit communications and trade, making it far harder to move food to areas of shortage.

In western Europe as a whole the situation both became more favourable and remained fragile. What was still a relatively static agrarian society had to cope with demographic fluctuations, not just growth. Downward trends in the death rate were interrupted by crises, as in the early 1740s. About 13 per cent of the population died of fever and starvation in Ireland in 1739–40. Mortality peaks due to subsistence crises did not end. As late as 1816 a major subsistence crisis associated with dearth and disease sent mortality rates up in Switzerland, Italy, Austria and Ireland. Thus the general rise in population did not free communities from anxiety. Instead, it put greater pressure on food supplies, including in areas where these increased. It is significant that food featured prominently in utopian works, such as those of Fénelon and Morelly, as well as in popular fantasies. The distribution of food reflected most obviously the nature of the socio-economic system, but fears about the consequences of subsistence crises ensured that even those who were never short of food had to consider its supply.

The general rise in population had many consequences. It led to increased pressure on the economic system as more sought land, employment, food and relief. The pressure on the land was a serious problem, because the primitive state of agricultural techniques and technology ensured that in much of Europe the area under cultivation could not be greatly increased. Overexploitation of what could be farmed led to environmental degradation, as in parts of Denmark.[9] Throughout Europe, areas of 'waste' lands not hitherto cultivated were farmed, largely as a result of private initiative. In Alsace, whose population and cultivated area had fallen greatly due to conflict, there was a re-population of the countryside that owed much to migration from Switzerland, so that by 1789 the rural population was three times that of a century earlier.

Across much of the continent, especially in western Europe, land hunger became a major factor, encouraging emigration. In the second half of the century the population of the Scottish Highlands showed a dramatic increase, raising pressure on a tiny and finite amount of arable land, while in France demographic growth forced younger sons and poorer sharecroppers to abandon their hopes of acquiring independent peasant status. The general rise in population led to an increase in the number of day labourers, the most economically vulnerable section of the workforce, in areas such as Majorca, Catalonia and southern Spain, and to growing rural pauperisation. As the population rose, poverty became more general in many areas of Europe. It was a particular problem in

regions that enjoyed little economic growth, such as Calabria in southern Italy or eastern Overijssel in the Netherlands, but it also affected those with a more favourable economic regime, such as much of France and the Rhineland. In the latter, food prices rose and land hunger led to the subdivision of holdings and an increase in the number of landless labourers. As undernourishment was no longer so commonly eliminated by early death it became the permanent condition of more people. Population growth disrupted local economies, leading to a greater concentration on the production of cereals at a time when, in general, insufficient attention was devoted to the raising of animals, the principal source of manure.

The rise in population thus became part of a more hostile environment. At the individual level, disease and malnutrition, if not starvation, were still constant presences. The consequences of demographic pressure were the principal determinants of the circumstances of the rural population in western Europe, although less so further east where the ratio between land and people was more favourable. In the towns unemployment and mendicity (begging) became more serious problems as people migrated from rural poverty. There was little by way of social welfare to ease the lot of individuals, and it is not surprising that some responded with despair, particularly as new births tested the family's ability to survive. The dramatic fate of a Viennese publican harassed by debts, who cut the throats of his pregnant wife and 9-month-old infant and threw himself into the Danube in February 1774, was less typical than the sorry records of the abandonment of children. In the second half of the century, there was a very substantial increase in the number abandoned in Italy, particularly of girls. A widespread preference for male over female babies was an aspect of the male-centred nature of society. In the 1780s the average rate of abandonment of children monthly was 160–70 in Lyons and over 650 in Paris. At the personal level, the demographic regime, whether old or new, was too often a cause of fear and misery.

Calamities and conservatism

Human vulnerability was not only displayed in the face of demographic pressures. The full range of calamities that could affect individuals and communities revealed in this period the fragility of personal circumstances and the weakness of communal responses. Non-epidemic illnesses could be a crushing blow to sufferers and there was little that could be done either to cure the

illnesses or to alleviate the pain. Opium and alcohol were the only painkillers or dullers and cheap laudanum, a preparation containing opium, was a widely used panacea. There was little to ease the pain of dying, except opiates. Childbirth was often a killer, disrupting families.

Agricultural labour was arduous, generally daylight to dusk in winter and about 6 a.m. to 6 p.m. in summer. Fishing was dangerous. Industrial employment was arduous and frequently dangerous. Many places of work were damp, poorly ventilated and/or badly lit. Many occupations involved exposure to hazardous substances, such as lead and mercury. The presence of explosive gas in mines made the use of candles there very dangerous. Apart from numerous accidents, mining also led to respiratory diseases due to dust and gas. Miners were affected by pneumoconiosis, mystagmus, rheumatism, the arduous work of heaving coal, and premature ageing, and they had a short life expectancy. Millers worked in dusty and noisy circumstances, frequently suffered from lice and often developed asthma, hernias and chronic back problems. Construction work was very dangerous.

In 1705 the first English edition of the *Treatise of the Diseases of Tradesmen* by Bernardino Ramazzini, professor of medicine at Padua, was published. Ramazzini had investigated the relationship between illness and occupation, and his book revealed the serious consequences of employment in an age when there was little understanding of health and safety at work. He pointed out that disorders could result from the strain of unusual physical demands or postures, such as those required of tailors and weavers. Ramazzini's account of the occupational illnesses of chemists, fishermen, bath attendants, vintners, tobacconists, washerwomen, of the phthisis acquired by stonemasons and miners, the eye trouble of gilders and printers, the sciatica of tailors and lethargy of potters, reveals the hazardous nature of industrial activity before the development of the factory system. Nevertheless, the notions of health and safety at work were barely understood.

Medical care was of limited assistance in dealing with these and other problems, as medical knowledge was often deficient and skilled practitioners were unavailable. Doctors were concentrated in the towns, and though France had one doctor per 10,000 inhabitants, in many areas they were a rarity, even if their services could be afforded. Medical treatments, such as blistering or mercury, were often painful, dangerous or enervating, and some patients refused treatment. Surgery was primitive and performed without anaesthetics. There was no effective medical treatment available for typhus, typhoid and dysentery.

Medicine was scarcely more efficacious in the case of animal diseases. These could have serious economic consequences and they revealed the limited options available to governments. The primitive nature of veterinary science ensured that the response to disease could not be preventive. Instead, animals had to be slaughtered, their movement prohibited. The outbreak of disease in the Italian territory of Lucca in 1715 led Florentine troops to close the border to livestock trade. In 1747 the Venetian army made similar moves. In late 1751 the Estates of Holland sought to prevent the spread of the cattle disease raging in Friesland, which had also broken out in Holland, by prohibiting the import and export of cattle and banning their movement within the province without proper authorisation. The effectiveness of these measures varied. Success against bovine disease in Flanders in the 1770s may reflect the determination of the Austrian government to enforce its policy of killing all ill or suspected animals and offering compensation, thus ensuring a degree of compliance, against the wishes of the local government and population. However, the Austrians could not prevent an epidemic carrying off many of their cavalry horses in Hungary in 1788.

The economic impact could be significant, in both the short and the long term. The epidemics of rinderpest that hit the cattle-breeders of Friesland and Groningen in the northern Netherlands led some to shift to grain production. In late 1749 the losses by the peasants of Groningen made it difficult for them to pay their taxes. Outbreaks of cattle disease could cripple local agriculture, as in Holstein in 1764 and Béarn in 1774, as well as driving up distant meat prices, thus indicating the developing economic links between distant regions. Meat prices in Bratislava and Vienna were driven up in 1787 by animal mortality in Hungary and Transylvania. Again the situation at the level of the individual proprietor was of a hostile and unpredictable environment, of forces that could be neither prevented nor propitiated, of the effort of years swept away in an instant. The line between independence and calamity, between being poor and falling into pauperdom, could be crossed easily and fast.

The climate presented a similar challenge. In general, the climate may have become more favourable, with warmer and drier summers improving crop yields. The 'little ice age' of the seventeenth century came to an end. The rise in average August temperatures may in part have been responsible for a decline in deaths due to bacillary dysentery. Yet the weather continued to have a major impact on economic life.[10] At the level of the individual, the capriciousness of the climate could be a major problem and the limited capacity of communal action could be all too apparent.

An obvious instance was flooding, both coastal and riverine. Across much of Europe, rivers had not been canalised and their flow was unregulated by any system of dams or reservoirs, while coastal defences were often inadequate or non-existent. Flooding could interfere with transport, along and across rivers, and with fishing, disrupt the activities of industries, such as milling, that were dependent on water power, and damage the most fertile agricultural areas. Coastal areas such as Friesland were vulnerable, and the location of most major towns on the coast or on major rivers had serious consequences. Florence and the lower valley of the Arno were heavily flooded in 1740, at the cost of many lives. When the Rhone rose in December 1763 two-thirds of Avignon went under water. Rural areas tended to be less well defended against flooding than towns, and there is little evidence that the situation improved during the century. Thousands of cattle died when the Dutch dykes were breached in the winter of 1725–6. In the winter of 1787–8 heavy rains and serious flooding washed away much of the seed grain in Saxony.

Drought was another problem, hitting water supplies, agriculture, river transport and waterpower-based manufacturing. It threatened famine, as in Geneva in 1723, and particular crops, such as in 1778 the vineyards of Burgundy. Water-power was also vulnerable to the ice of winter, which prevented mills from operating, causing unemployment and flour shortages. As the water mills were frozen up in early 1748 the Poles were forced to resort to hand mills in order to grind the corn, a far more arduous process. Because of ice, the working year of the Dutch towboats was only 300 days, and their labour force, largely unskilled and hired for casual rather than long-term employment, suffered if the winter was particularly harsh and the working year was curtailed. An alternative source of energy to water was wind, but windmills were affected by storms.

Agriculture was naturally vulnerable to the weather. There were few improved crop strains, and rainy winters produced diseased and swollen crops, while late frosts attacked wheat. The frosts of 1709 killed most of the lemon trees near Genoa, ending the export of the product. Many other aspects of the human environment were also vulnerable. Houses were affected by lightning and also susceptible to fires, such as the terrible fires at Rennes in 1720, Vyborg in 1738, Moscow in 1753 and Madrid in 1790. Straw-thatched buildings provided attractive environments for numerous pests and were also fire hazards, not least because they often lacked chimneys. Difficulties faced attempts to drain malarial lowlands in southern Europe, and in much of the area habitation was restricted to the hills and

avoided the highly cultivated valley bottoms and their often stagnant waters.

Another aspect of the hostile environment was the confrontation between man and other beasts, both real and imaginary. Wolves and bears, which could attack humans and their farm animals, were a problem and not only in mountainous areas. In 1699 near Abbeville in France wolves regularly attacked sheep. They were a serious threat near Senlis, north of Paris, in 1717, and in south-western France in 1766. In the bad winter of 1783–4 the *Journal de Physique* reported numerous deaths in France from marauding wolves. In mountainous areas the conflict was more constant, and the wolves' heads and bears' paws displayed in areas such as Savoy were a testimony to an often bitter struggle for the control of alpine grazing areas.

Other animals could also pose problems. The absence of pesticides and the difficulties in protecting crops and stored food exacerbated the situation. Though the emperor Joseph II enjoyed hunting, he ordered the destruction of all wild pigs on account of the damage they did to peasant property. Mice and rats destroyed a lot of food and crops, plagues of mice having disastrous effects on the harvests in East Friesland in 1773 and 1787. Worms damaged the Dutch dykes in the 1730s and those in East Friesland in the 1760s. When locusts advanced towards Vienna in 1749 they were seen as a manifestation of divine wrath and public prayers were ordered to avert this.

The threat from real animals was joined in the hostile environment by the anxieties aroused by imaginary creatures. Strange beasts that attacked human beings were reported. One such, near Saragossa in Spain in 1718, was described as ox-sized, with a head like a wolf, a long tail and three pointed horns. Another savage creature was described on several occasions in the Gévaudan region of France in the mid 1760s. Popular folk tales, the support of biblical and classical authority and the continual discovery of gigantic bones in the earth led to a belief in giants that was supported by many clerics.

Fear of witches persisted.[11] Although the last recorded witch trial in England occurred in 1717, the high point in witch-hunting in the Polish province of Mazovia in the early modern period was the first quarter of the century. Distinctions between heresy, blasphemy, sorcery and necromancy were often blurred, torture was employed, and witches were burned, a practice that was not declared illegal in Poland until 1776.

A sustained debate over witches, magic and vampires took place in the middle years of the century, particularly in Italy and France. Scipione Maffei's *Magic Arts Annihilated* appeared in 1754. Eight

years earlier the French cleric and scholar Augustin Calmet had published a book on vampires. George II of Britain believed in vampires. The belief in vampires was attacked in the *Encyclopédie*, the repository of liberal learning and fashionable views launched in France in 1751, in an article that appeared in 1765. Calmet's book was also criticised and cited as an instance of the impact of superstition on the human spirit. In 1772 the leading liberal French intellectual Voltaire condemned Calmet's work and queried how it was possible after the work of the English philosophers Locke and Shaftesbury, and during the period when the French liberal intellectuals d'Alembert and Diderot were active, to write a book on, or believe in, vampires. On this, as on so much else, Voltaire's righteous scorn was a misleading guide to popular attitudes. Witch-hunting, with only a few exceptions, did die out, but there is little sign that belief in vampirism abated, and panics occurred in Hungary, Bohemia and Moravia in the 1730s, 1750s and 1770s. A variant of concern about vampirism could also be found in the centre of European consciousness, Paris, in 1749–50. It was widely believed that children were being seized and killed in order to provide blood for baths to help Louis XV combat leprosy. This concern about an institutionalised vampirism subverted the notion of the monarch as a sacral healer. Vampires and the supernatural also played a role in literature, for example the influential ballad *Lenore* (1773) by Gottfried Bürger.[12]

Vampires were not alone in the taxonomy of the dark side of Enlightenment Europe. An anonymous German writer of 1782 claimed that the uncertainties of agricultural life fostered in the peasant a true humility and a sense of his dependence upon factors over which he had no control. In comprehending or assuaging these forces, traditional astrological and occult beliefs and practices appear to have played a large role, particularly in rural areas. It was an animistic world and one inhabited by spirits, with death no necessary barrier to activity, experience and intervention. In his *The Life of my Father* (1778), Nicolas Restif de la Bretonne (1734–1806) recorded that in his parental milieu, that of a wealthy French peasant near Auxerre, shepherds told tales of the transmigration of souls to animals and werewolves. The enlightened Baden bureaucrat Johann Reinhard (1714–72), growing up in a Calvinist home in the German principality of Nassau, encountered a world peopled largely by witches and ghosts, where the devil was omnipresent. As the devil played a major role in Christian consciousness, it was scarcely surprising that many invested him with a panoply of supporters and acolytes who lived not in any separate world, but in a sphere that enabled

them to intervene directly in human affairs. In 1727 Cardinal Fleury, the leading French minister, expressed his belief that the devil was able to thrash his human subjects. At the end of the century, belief in sorcery and witchcraft was still widespread among the rural population of the German principalities of Jülich and Mark. More generally, there was a widespread belief in fairies. They were seen as having a capacity for good or ill, and it was necessary to propiciate them, for example by offering food and drink. Hostile external forces were blamed for intractable illness. The world outside people's dwellings, especially after dark, seemed more hostile and mysterious than is comprehensible to modern people who are accustomed to using electricity for illumination. In the absence of the moon, the night was pitch dark, especially in rural areas. Within houses it was shadowy when the candles were lit and dark when they were snuffed.

Popular religious beliefs, however removed from the teachings of the churches, did not amount to an alternative religion. Pagan practices were not the same as paganism. Instead, such beliefs and practices co-existed or were intertwined with Christian counterparts, with little sense of any incompatibility, especially among ordinary lay folk in rural areas.

If old superstitions had lost little of their hold in rural areas, it could be suggested that the cultural gap between popular and elite beliefs had grown wider than in the previous century, that views and activities hitherto general, such as belief in astrology, had been driven down the social scale. Many of the wealthy and well-educated appear to have lost their faith in magical healing, prophecy and witchcraft. This oft-stated argument has to be employed with care. Clearly fashion played an important role in elite culture, increasingly so as the growth in the quantity of printed works spread knowledge of what was judged desirable. It is difficult, however, to assess the significance of the changes in fashion. The popularity of miraculous medical cures and the vogue, in the France of the 1780s, for the theory of animal magnetism advocated by the Austrian doctor Mesmer, who advanced a complicated post-Newtonian cosmology, suggest that it is dangerous to regard the culture of the elite as in some way better-informed. It was rather the case that their superstitions were faddish.

At all levels of society, there was a wish to understand the hostile environment and to cope with the fears that it inspired and the unpredictable gamble that was life.[13] There was a search for stability in an essentially unstable world, an attempt to reconcile divine justice with human suffering, and to order experience in a way that reflected the hard and arbitrary nature of life. The

religious world view provided the most effective explanatory model, the best psychological defences and the essential note of continuity. In Russia, Peter the Great's policies were understood by many in the light of beliefs that he was an un-Russian evil substitute or antiChrist. His denial of the divine identity of traditional Russian monarchy, his blasphemy, his theft of time from God when he changed the calendar, and his sacrilegious violation of the image of God in man, when he forced people to cut off their beards, could be understood by presenting the world as a battleground between God and the devil. In Spain manuals of piety, religious tracts and sermons that stressed the transitory nature of life on earth and the spiritual dangers facing the rich were very popular and frequently reprinted.

Faced with calamities, communities and individuals turned to the church. God was seen as providing means to cure all ills, if only they could be discovered. It was common to ring church bells against thunder and lightning. In 1775, a month after Joseph Priestley's chemical experiments were exhibited at the Academy of Dijon, the local church bells were rung to drive away a storm. Individuals and communities sought the support of interceding powers. In 1725, when Paris was threatened with flooding and a bad harvest, the reliquary of the local patron saint, Geneviève, was carried in procession in the hope of stopping the heavy rain, as in 1696 it had been deployed against drought. The following year a crude engraving with an explanatory text was produced. In 1755 the Venetian authorities, faced with a lack of drinking water, exposed a statue of the Virgin Mary. Communal dedication and good conduct were both sought. In 1756 Charles Emmanuel III of Sardinia and his family participated in the celebrations in the cathedral of Turin to give thanks that the city had survived a recent earthquake relatively unscathed. Pope Clement XIII responded to Italian famine in the 1760s with prayers and ceremonies. In January 1765 all public diversions were suspended in Florence and public prayers held for the return of good weather, as they were in Milan in 1765 and 1766. In Terracina in central Italy, a miraculous image of the Virgin was carried in procession in April 1769 attended by great crowds in the hope of securing better weather. At the beginning of 1788 a violent gale on the north-west coasts of France was met by solemn processions to the churches and night-time services.

The hostile environment was understood in terms of retribution, with the possibility of gaining remission by good actions, either in terms of religious services or by satisfying the demands of the occult and spirit world. It was thus possible to construct a cosmology that was acceptable in both Christian and non-Christian

terms. For many people, Christian and non-Christian were not alternatives, but rather closely related beliefs and habits of thought.

In some circles there was questioning of the notion of divine intervention. Nearly all the writers in the Austrian Netherlands who discussed the Lisbon earthquake of 1755 interpreted it as a divine judgement. Most came to a similar conclusion about the bovine pest that affected the Austrian Netherlands in 1769–71, but a distinct minority disagreed. Similarly the prediction that Naples would be entirely destroyed by an earthquake in March 1769 threw some, but not all, of the population into confusion. At the beginning of the century care of the handicapped was a preserve of the clergy, and deaf-mutes were thought to be possessed by the devil. This did not prevent Jacob Pereire (1715–80) from seeking to rehabilitate them, although his development of this unknown skill and subsequent cures were understood by many as miracles. Understanding of handicaps and compassion towards the handicapped do not appear to have greatly increased during the century.

The search for divine support did not necessarily lead to worldly passivity, particularly on the communal level. If the environment was understood as hostile, there was, nevertheless, much activity aimed at coping with the consequences. This was by no means new. Whether clearing the waste, or draining Dutch polders and Mediterranean malarial swamps, there was clear continuity with the previous century, and in many areas a resumption of activity after the serious wars of the period 1688–1721. In some areas progress was definitely made. Science was beginning to transform the relationship between man and the environment: some buildings were better constructed, lightning was tamed by lightning conductors, and a few illnesses were mitigated. Ironically, there were also signs of a problem that was to become more urgent in the nineteenth century: the human and environmental costs of urban and industrial development. In 1714 the French envoy in London complained repeatedly about the effect on his breathing of the coal smoke that enveloped the city.[14] During the course of the century much of the Black Forest suffered deforestation in order to provide timber in particular for the Dutch shipbuilding industry. The denuded slopes suffered serious erosion.

Nevertheless, one of the most obvious features of the eighteenth century is the limited progress that was made in dealing with the hostile environment and the catastrophes that affected individuals and communities so grievously. Those communities whose population grew tended to face serious problems as pressures mounted on food supplies and living standards. The limited progress that was made in improving the condition of man and

the human environment is understandable in light of the restricted technology of the age and the scanty resources of government. It also reflected the dominant attitude of the period. Despite the confidence of some in the possibility of human progress through communal action, the majority of the population lived in a precarious fashion, fearful of the future and possessing only limited aspirations. This popular conservatism was to play a major part in hindering government plans for change.

2 Economic Framework

Agriculture

Agriculture was the principal source of employment and wealth, the most significant sector of the economy, the basis of the taxation – government, ecclesiastic (tithes), seigneurial and proprietorial (rents) – that funded most other activities. Land and its products provided both the structure of the social system and the bulk of the wealth that kept it in being and provided the opportunities for social change. The vast majority of the population lived in the countryside and agricultural activity dominated the lives of the people of Europe. In 1789, 74 per cent of the active population in the Vivarais region in France were employed in agriculture, a fairly typical figure.

Furthermore, the impact of agriculture was not restricted to rural areas. There was no hard barrier separating town from countryside, industry and trade from farming, workers in industry from agricultural labourers. In regions such as Bohemia (in the modern Czech Republic) much industrial production took place in rural areas and many industries such as the metal trades, glass-making and pottery, even textiles, were to be found in the coal-mining areas, which, as yet, were also still agricultural. In areas such as French Flanders many of those who worked in rural industry also tended plots of land or were members of a family economy in which another member was a part of the agricultural workforce.

In some areas of Europe, such as Sicily, a surprisingly high percentage of the population lived in towns. However, this was a reflection of traditional settlement patterns, rather than of a functional response to urban activities, for, in much of Mediterranean Europe, agricultural workers lived in towns or substantial villages rather than in dispersed settlements. To a certain extent this was true of all of Europe. Towns tended to be surrounded by areas of intensive agriculture, rather than the suburbia of the modern age, and in addition, agricultural activities, such as horticulture, were common within town walls, there being no zoning system to prohibit them or any sense that agriculture was in some way functionally incompatible with urban status.

The links between agriculture, industry and trade were close. The limited advances in the state of technological and scientific

knowledge ensured that manufacturing was based on natural products. The age of synthesised products had not yet arrived. Most manufacturing involved the processing of agricultural goods, particularly if forestry is regarded both as a variant on such extensive agricultural activities as animal husbandry and as a source of casual or seasonal employment for the agricultural workforce. The staple industrial activities were concerned with the production of consumer goods – food, drink, clothes, shoes and furniture – that relied on raw materials produced in the countryside. Though some processing involved agricultural products produced outside Europe, such as cotton, West Indian sugarcane and North American tobacco, the source of most goods was European and often local: thus woollen and, even more locally based, leather industries were found almost universally throughout Europe. Thus industrial activity, whether urban or rural, was closely involved with the agricultural hinterland. For example, the town of Niort in western France, where animal skins played an important role in the local economy in the 1720s, depended on receiving large numbers of goat kids from the surrounding countryside. Trade was also closely involved with agricultural products, processed or unprocessed, and this was as true of distant as of local trade.

As the bulk of the population lived in rural areas and engaged in agricultural activities, it is not surprising that the prosperity of these activities played a significant role in determining the nature of the purchasing power in the communities of Europe. Rural wealth created a market both for industrial goods and for expensive agricultural products, such as meat. Conversely poverty, the commonest state for the bulk of the rural population, acted as a permanent limitation on both. Any rise in the cost of agricultural products, particularly cereals, affected the urban population, reducing purchasing power, both in the towns and among much of the rural population, and restricting the market for manufactured goods. Alterations in the prices of agricultural products were a constant feature, essentially for seasonal reasons, the price of foodstuffs generally rising to a peak in the early summer as last year's harvest was used up. Harvest variations dictated additional price changes that were often very sharp. The consequences of these contributed to a sense of uncertainty and helped to focus official awareness on agriculture.

The eighteenth was the last century when Europe had to feed itself. Food imports from outside Europe were still essentially luxury goods, such as sugar, that could bear the transportation costs of a trading system that relied on small wind-powered ships lacking effective refrigeration and storage facilities, although fish

was imported from Newfoundland and rice from the Carolinas. The following century was to witness the opening up of food sources in North America, Argentina and Australasia, with refrigeration, the steam-powered iron ship and effective European control in these areas arguably helping, as much as any developments on the continent itself, to free Europe from the Malthusian equation of population size and limited resources.

Before the late nineteenth century, Europe had essentially to be self-sufficient, and as a result, land in 1800, as in 1700, was the principal source of national and individual wealth. The prevailing systems of farming did not produce enough to create a reliable margin of safety in the event of harvest failures and few regions produced a sufficiently large marketable surplus to help areas where cereal crops failed. Slow and expensive transport limited the effect of those which did. As a result, movements in agricultural prices were not essentially restricted by intra-European trade. In addition, although food imports could help to alleviate the consequences of harvest failures, when sharply rising prices justified transport costs, they could neither enable government to ignore the state of agriculture, nor permit any general regional curtailing of agriculture in order to specialise in different economic activities. The need for food in an agricultural regime characterised by low productivity and uncertain production forced all sections of European society and all areas of Europe, however unfavourable they might be for food production, to devote attention to agriculture. Furthermore, agricultural regions had to concentrate on cereal production to an extent often disproportionate to their capabilities. Grain had to be produced even in areas best suited to animal husbandry.

The reality of social life was not the clean, healthy, plump peasants of the painter Boucher's idyllic landscapes, without spots or blemishes, their activities framed in a lush, sunny and clean countryside inhabited by animals as healthy and plump as the people, but a harsh agricultural and social regime. For the bulk of the population, the harvest was the key factor in individual and communal fortunes, the only other developments proving of comparable potential importance, epidemic disease and warfare, being episodic. This situation did not alter during the century, which puts into perspective the limited impact of the peacetime actions of government in both the economy and other spheres of life, and also explains the popular reluctance to consider new ways to organise the food supply, and the appeal of paternalist landowners.

Recognising the importance of agricultural production and distribution, governments and intellectuals devoted attention to

ways in which the situation could be improved. Motives might vary, from national strength to an improvement in the lot of the peasantry, but, alongside the continual interest in developing manufacturing and oceanic trade, there was an awareness of the need to help agriculture. Fénelon, the leading clerical critic of Louis XIV, linked economic prosperity to the cultivation of the soil in his *Télèmaque* of 1699. The French economic writers of the mid-century known as the 'physiocrats', Quesnay, Dupont de Nemours, Mirabeau, Mercier de la Rivière, argued that any increase in wealth in the manufacturing and commercial spheres could only take place on the basis of prior increases in the amount of raw materials extracted from nature. They claimed that the land was the sole source of real wealth, that manufacturing simply changed the form of its products and that trade only moved them. The physiocratic call for more investment in agriculture was combined with proposals designed to increase its profitability. The argument that grain must be allowed to rise to its natural price level and that restrictions on its sale, such as export prohibitions, should be reduced, was intended to transfer more of the benefit of grain production to the rural community. Within this community the physiocrats wished to prevent the peasantry from being burdened by high rents in order to increase their incentive for work, and to ensure that funds were available locally for agricultural investment. They wanted taxes to be kept low in order to increase the return to the landlord.

Interest in agriculture was not restricted to the physiocrats. The Dutch 'Patriot' writer Schimmelpennick argued in 1784 that a republic was undoubtedly a viable form of government if the energy of the population was directed towards agriculture, which he suggested, in common with other writers such as the American Thomas Jefferson, was the guarantee of equality and virtue.

State interest was always present as a result of the social, economic and political costs of food shortage, but it was further increased for fiscal reasons. In a society where the bulk of employment, revenues and national production stemmed from agricultural activity, it naturally followed that such activity was the principal fiscal resource of the state. Fiscal interest grew in areas where agriculture had moved from self-sufficiency or a barter economy to market relationships within a cash context. Such a development made it easier for the state to derive fiscal benefit from agriculture. In Russia the growth in agricultural exports led to an increase in government fiscal interest. As the European agricultural economy in part became increasingly integrated and crops or animal husbandry for cash sale became more significant, the potential direct tax benefit from government intervention in

agriculture rose. This played an important role in the second half of the century in government policies for the relief of the peasantry from various burdens, as the benefit to be derived from a well-motivated agricultural workforce appeared the easiest way to raise the national fiscal yield. In 1788 the Bavarian government rejected an Austrian offer to purchase 2000 horses with the argument that, although the money would benefit poor Bavaria, the true wealth of the state lay not in money, but in agriculture, for which the horses were required.

There were some signs during the century of an improvement in agricultural production, the dissemination of new ideas and techniques and the increasing integration of European agriculture, as specialisation, commerce and the cash economy developed. There were, however, equal signs of continuing conservative practices, and local economies scarcely affected by change elsewhere. Farming was diverse and possibly less improved than the signs of and interest in agrarian change would suggest. As the situation of local agricultural economies was of crucial importance to the health and prosperity of the population, it is necessary to consider the reasons for the diverse responses to the possibilities for agrarian change.

New lands cultivated

An obvious approach to the problem of increasing agricultural production was the traditional method, the extension of the area used for agrarian purposes and, in particular, the cultivated area. In order to transport the food produced to the European markets, this had to take the form of an increase in the cultivated area in Europe rather than in the overseas colonies. The most significant European increases took place as a result of the actions of the two states that extended themselves through territorial colonisation into neighbouring areas, Russia and Austria. Between 1680 and 1720 both powers pushed their frontiers forward either into areas hitherto Turkish, such as Hungary, or into those that had essentially served as buffer-zones with the Turkish Empire, principally the Ukraine. In the case of Russia this expansion continued after 1720, at the expense of the Turks and of other non-Russian peoples to the south of Russia. These gains offered tremendous opportunities for an increase in agricultural production. Some of the areas, such as the black-soil region of the Ukraine, were naturally fertile and many, such as the central Hungarian plain, had not had their fertility denuded by cereal cultivation, having been hitherto essentially zones of animal husbandry.

Not all of the schemes for colonisation and agricultural improvement were successful, but there is no doubt of an appreciable increase in the area devoted to cereals. The Ukraine and river Don regions of Russia both became significant grain-exporting areas, and a major reason for the strong interest displayed during the 1780s in the development of trade with southern Russia through the Black Sea was the wish to exploit what was perceived correctly to be a significant likely source from which to feed Europe. The Volga area possessed enormous economic possibilities, with tobacco as a promising cash crop. If, for western Europe, colonialisation was essentially trans-oceanic, in central and eastern Europe the opportunities were not seen to be so distant. 'You may look upon Hungary as a new World,' wrote one diplomat in 1736;[1] and if, by the second half of the century, this aspiration was largely centred on southern Russia, it was, nevertheless, an important one that helped to create a sense of change and opportunity.

This feeling played a major role in one of the most significant of the population changes in the century, the move of a large number of people to the Austrian and Russian zones of colonisation. Some of this migration was internal, the movement of Austrians and Russians from areas of high population density and limited economic opportunity to lands that were essentially open. Part of the settled population of the new lands was indigenous, people who had been forced or encouraged to exchange for cereal cultivation a nomadic or semi-nomadic life and/or one devoted to animal husbandry. In the case of the Austrian Balkan frontier lands a significant percentage of the population were Slavs, particularly Serbs, who had fled Turkish rule in the 1690s. About 40,000 Serbians led by Arsenije IV, the Patriarch of Pec, had moved in this period. Migration in the Balkans owed much to warfare, since opposing armies viewed people as a resource to be denied to their enemies.

A large number of the migrants to the new lands were from central or western Europe, and formed part of the tendency of people to move in search of agrarian opportunity within a continent where the possibility of acquiring land varied greatly, and agriculture was the principal source of employment and wealth. The second Russian census, begun in 1744, showed that over the previous quarter-century the steepest percentage increases in population had occurred in increasingly-settled frontier or peripheral areas, such as the lower Volga, the northern Urals and the Ukraine.

For some, the new lands were in America, particularly the British colonies in North America, which placed fewer restrictions

than the other American colonies on the immigration of non-nationals and offered opportunities in an agricultural and climatic regime that was not too dissimilar from large areas of Europe. Many Germans went to Georgia, and between 1760 and 1775 at least 12,000 German immigrants entered the port of Philadelphia. Of the approximately half a million people who emigrated from south-west Germany and Switzerland in the eighteenth century, about 40 per cent went to North America, the rest to Hungary, Prussia and Russia. Similarly, Rhineland emigration was shared by North America, Hungary, Prussia, Russia and Galicia, part of Poland that was acquired by Austria in 1772.

The key to the development of most 'unproductive' lands, whether marginal land neglected by settled communities or newly colonised, was the establishment of an adequate population in these regions, although this was very much the perspective of the colonisers. Immigration was actively encouraged by rulers for this reason. Frederick the Great followed his father's policy of seeking migrants and by 1780 about 5 per cent of the Prussian population were immigrant rural settlers. Laws were relaxed for them, people being more desirable than the policy of uniformity. In 1772 a Prussian edict permitted foreigners who wished to settle in the province of Magdeburg to retain non-Prussian legal codes. Catherine the Great devoted considerable attention to the colonisation of southern Russia. Her proclamations of 1762 and 1763 offered significant privileges to foreigners settling in Russia, and she spent vast sums, between 5 and 6 million roubles, on the settlement project. Most of the immigrants were Germans. During Catherine's reign about 75,000 foreign colonists arrived, over 25,000 of them settling on the Volga between 1764 and 1775. Large numbers of migrants also moved into the eastern areas of the Austrian Empire. In early 1771 it was reported that over 20,000 people had left famine-stricken Lorraine for Hungary. The continuing migration into Hungary and Galicia was by 1787 principally from the western regions of Germany. Emigration was regarded as a sufficient threat to national strength to lead several states to take moves to prevent it. Danish regulations sought to limit the internal mobility of the common rural population and in 1753 Denmark prohibited emigration.

The migration to the new lands in eastern Europe was not always a success. Many immigrants became disenchanted, and a trickle returned to their original homes, such as the Lorrainers who came back from Hungary in 1752 feeling cheated, as it had not turned out to be the land of opportunity, wealth and security that they had been promised. A similar disappointment affected many of those who went to Russia. Despite much expenditure,

the government was unable to fulfil the grand vision of Catherine and the help provided for the migrants was limited. The frontier zone lacked amenities, the indigenous population was not welcoming, and schemes, such as that for Volga tobacco-growing, took longer to come to fruition than had been anticipated. Nevertheless, these developments were of considerable importance, offering Europe a potential escape from the Malthusian dilemma. It could be suggested that for Russia the economic development of the steppe lands was as important as the conquest of Sweden's eastern Baltic provinces in 1710–11, not least in helping to make her politically a great power by increasing the resources at her disposal.

Less spectacular than the bringing of more intensive agriculture to the frontier lands of Austria and Russia was the process of internal colonisation elsewhere in Europe. It was a common theme of agrarian activity throughout the continent, although, in the absence of comprehensive detailed statistics for agricultural production, it is difficult to say whether increases in production were due largely to an extension of the cultivated area or to improvements in technique. The extension of the cultivated area in Europe, whether achieved through the digging of irrigation ditches, the clearing of trees or the removal of stones, was essentially the product of labour-intensive methods. This was due to both the technology of the period and the nature of the available resources.

In much of Europe, internal colonisation enjoyed government support. A French declaration of 1766 granted exemption from tax and tithe to land abandoned for at least 40 years that was brought into cultivation. In areas such as parts of Spain and Hesse Cassel hitherto without settled agriculture, villages were created thanks to government initiative. The attitudes held gave a clear preference to settled communities and intensive agriculture. Uncultivated areas were regarded as waste lands though in fact they might support a long-settled population living on forestry, semi-nomadic animal husbandry and 'cut-and-burn' shifting cereal cultivation. This stance was associated with the suspicion with which such peoples were often viewed both by governments and by the population of intensively-farmed lowland areas.

Internal colonisation was not solely due to government encouragement. With the exception of Prussia, which faced particular problems of underpopulation after the famine of the early years of the century and the mid-century wars, it is arguable indeed that this encouragement was of limited effect and importance. Colonisation was a direct product of land hunger, whether it took

the form of clearing the waste, as in France in the 1760s, or of alterations in the use of land already within the agrarian system. In Wallachia and Moldavia the land was commonly unimproved, and there was a general reduction in the amount left as forestry and pasture, in order to make way for the spread of grain cultivation. The principal stimulus was export of grain to Constantinople and further afield. On the contrary, demographic pressure, rather than economic opportunities, helped to account for the clearing of some of the forests of Béarn in south-west France, and the spread of the cultivated area in Lombardy. In Sweden, the increase in agricultural production was largely a matter of internal colonisation. Demographic pressure increasingly ensured that marginal arable land was brought under the plough, particularly in south-east Sweden. Feeble agrarian growth contributed to the relative decline of east-central Sweden. The more vigorous growth that took place in west Sweden and in Scania rested upon an expansion of the cultivated acreage, rather than on any significant improvements in productivity. In contrast the opportunities for breaking new ground were more limited in the east-central regions, where, in addition, many settlements were dominated by large estates and there were restrictions on the establishment of new farm households. Similarly, in late seventeenth-century Sicily, increases in wheat production were achieved only by continuously extending the area of land under cultivation, and crop sizes were maintained only by sowing on tilled fallow. The tilling itself was done by hoes that barely scratched the surface of the soil.

New methods

There were also qualitative advances in agriculture. As some of the changes in agrarian practice called for by agricultural reformers did not demand specialised knowledge or equipment, it was possible to improve farming without costly changes. Such improvement was pressed forward by a sizeable number of activists. Model farms were established by landlords, such as the Saxon Johann Schubart, who advocated the cultivation of clover and was ennobled by Joseph II.

Practical advice was offered by agricultural literature. There was a marked increase in the literature of agricultural improvement, particularly in western Europe, where authors such as Jethro Tull and Duhamel de Monceau argued the case for new techniques. Though Tull's *Horse Hoeing Husbandry* (1733) appeared earlier, most of the significant works dated from the second half of the century, as did their republication and dissemination. Whereas no Polish publications on agriculture existed in 1700, about 300

appeared in the half-century after 1750. A journal devoted to agriculture was founded in Parma in the 1760s, and the ducal government was well aware of the possibility of extending agricultural knowledge through publications. It was not until the 1770s that the real introduction of agricultural innovations into Hungarian literature took place. The first significant work was written by Lajos Mitterpacher, a Jesuit scholar, who, after the dissolution of the Order, became professor of natural history and agricultural science at the University of Buda. His three-volume *Elements of Agriculture* appeared between 1777 and 1794 and was written in Latin, still the *lingua franca* of education, science, politics and public life in most of eastern Europe. The book contained extensive scientific discussions which both sought to throw new light on agricultural problems from the perspectives of biology, physics and chemistry and drew on the work of British scientists, such as Priestley. A basic source of the work was Arthur Young's account of his travels in northern England in a German translation published in Leipzig in 1772. Whereas in the first half of the century, books published in nearby Halle had spread Pietist ideas throughout eastern Europe, in the 1770s Leipzig disseminated Young's views on turnips. An earlier more specialised work on bee-keeping had a similar history. John Geddy's *English Apiary* of 1675, reprinted in 1722, dealt with a method whereby honey could be taken out of the hive without first killing off the bees by fumigation. A German translation was published in Leipzig in 1727, and a Hungarian translation of this, not of Geddy's original, appeared in 1759.

Alongside the literature, agricultural societies appeared throughout Europe. They played a major role in publicising change. In 1759 the Academy of Besançon organised a competition for the discovery of a vegetable substance capable of replacing bread in case of need. It was won by the young Antoine Parmentier, the populariser in France of the potato, with a chemical examination of that plant. Agrarian improvement became a cult for considerable numbers of gentlemen farmers. This reflected the traditional desire of landowners to benefit from their holdings, but also, in part, a determination to exploit the often exaggerated and only partially grasped opportunities that agricultural change appeared to offer. The instructions of wealthy Russian nobles to their stewards in the early years of the century indicate a new concern for efficient record keeping, improved yields, the systematisation of rent obligations and increased cash profits. The instructions for one of the Sheremetev estates in 1703 suggested that the peasantry provide money in place of their customary offerings of supplies for the landlord's table. In Denmark, land

ownership was no longer an indication of noble status, even if in practice it still conferred social position, and a more utilitarian approach to land developed during the century, with a move towards large-scale farming, enclosure and rural reform in the second half. In southern Italy in the 1780s the Calabrian landlord and aristocrat Domenico Grimaldi demanded a state loan for new presses for the olive oil industry. He proposed that the king should appoint instructors to tour the countryside demonstrating the use of the new presses, which, in fact, caught on among the surrounding large landowners. Agricultural improvement became fashionable with many British landowners, who often took pride in being painted alongside bulky bullocks and other signs of agrarian progress.

Aristocratic interest was matched by government concern. Many of the Rhineland princes sponsored agriculture, improving grazing and appointing commissioners to promote stall-feeding and selective breeding. In Transylvania, where the rudimentary level of agricultural technology was associated with a two-field, two-year rotation – one year cultivation, one year fallow – the government tried to encourage a shift to a three-field, three-year rotation with fallow every third year only, a way to enhance production. In 1752, the new king of Sweden, Adolphus-Frederick, ordered the provincial governors to encourage the peasantry to cultivate tobacco and plants that were of use for textile production, such as dyes. Tillot, the leading minister in the Italian duchy of Parma in the 1760s, encouraged the cultivation of hemp, flax, sainfoin, potatoes, mulberries and vines and the improvement of animal breeding, and sponsored the publication of a work on bee-keeping. Sir Benjamin Thompson, who as Count Rumford, played a major role in the Bavarian government between 1784 and 1795, was a keen advocate of the potato and maize, which he believed to be nourishing and cheap, and sought to use the army to introduce agricultural improvements. He established military gardens with the object of publicising new agricultural methods and crops, particularly the potato. In France agricultural improvers, supported by the government, sought to introduce rice, a move, however, greeted with popular anger and, in the Auvergne, rioting, as it was regarded as a cause of disease.

The impact of the agricultural improvers is open to question. It is easy to point to failures, such as the numerous but ineffectual Italian agricultural academies or, in France, the marquis de Turbilly, who published a work in 1760 on the reclamation of land for cultivation, only to have his own success queried by Young. Many innovations had only a limited effect, such as the

artificial incubator developed by Dominique Chazotte in Parma in the 1760s, or the potato-processing machine tested in the same town in 1762. Regulations were often neither observed nor enforced. It was claimed in 1765 that the Parmesan laws on the harvesting of silk cocoons and the spinning of silk and the 1760 law on the plantation of mulberries were not being enforced.

There are, however, signs of a qualitative as well as a quantitative improvement in agriculture, and these signs were not restricted to the areas that are commonly associated with eighteenth-century agricultural improvement, namely England, the Low Countries and Catalonia. In these, particularly the first two, improvement did not begin or methods alter significantly with the eighteenth century. The reason for agricultural development in these areas is difficult to isolate, and possible causal links have to be assessed with care. The presence of substantial local markets was doubtless significant, but these did not have comparable effects around Naples or Constantinople. The presence of a large local labour force aided projects of land reclamation and improvement, such as irrigation, drainage and reclamation from the sea, and facilitated intensive techniques of cultivation, such as deep ploughing, planting in rows and regular weeding. Yet other areas with a comparable labour force, such as Sicily, did not witness similar changes. The mutually beneficial relationship, not least in terms of manure, between cultivation and animal husbandry was significant in England, the Low Countries and Catalonia, but agrarian growth was clearly not simply a factor of manure production, as is demonstrated by Hungary, an area of extensive husbandry. It is possible that tenurial practices were more important. In all three regions much useful land was owned by the cultivators and they benefited directly from raised productivity, whereas in much of Europe such land was often the more marginal areas. Continuity among the farming population, either through the inheritance of family farms, as in Catalonia and some of the Low Countries, or through regularly renewed leases, as in England, was crucial in assisting the development of the land's potential. Different attitudes towards the land were important in encouraging the spread of agricultural improvement.

In England, Catalonia and the Low Countries, it is possible to point to obvious signs of qualitative improvement. The spread of fodder crops, such as clover, coleseed and turnips, helped to eliminate fallow and to increase the capacity of the rural economy to rear more animals, sources both of crucial manure and of valuable capital, for animals were the most significant 'cash crop' in the economy. The spread of convertible or 'up and down' husbandry, in which land alternated between pasture and arable