

NUTRITION, WORK AND DISEASE.

Diet influences almost every known human disease in some way or other. It is the most general background feature. Even when it does not directly cause ill health, it will powerfully affect mortality and morbidity rates because well fed populations can resist various micro-organisms better than badly fed ones. We are told that 'There is no doubt that malnutrition in man produces a severe defect in the function of the immune system.'¹ The reverse is also true. For instance, 'Countries where endemic diseases such as malaria occur, often show a general state of malnutrition, high infant and tuberculosis death rates; lethargy and weakness are often so pronounced as to slow down agricultural activities, and so further lower the nutritional state.'² The situation is made more complicated, however, by the finding that once one rises above extreme malnutrition, it is sometimes the case that, as reported in a famous Indian study, 'There was not much difference in death rates among mildly malnourished and well-nourished children; only among the severely malnourished did the risk of death rise sharply.'³

As an eighteenth-century aphorism put it 'The Means of preserving Life, which is Eating and Drinking, has destroy'd more Lives than ever did sword, Famine or Pestilence.'⁴ Or as an eighteenth-century doctor wrote, 'Unwholesome food, and irregularities in diet, occasion many diseases. There is no doubt but the whole constitution of the body may be changed by diet alone.'⁵ The view was also held by nineteenth-century doctors. Willis, an English doctor in mid-nineteenth-century Japan, wrote that 'In very many cases the enlightened doctor knows that it is not medicine so much as good food that is required to bring about the recovery of his patient.'⁶ A few years later another visitor to Japan widened the connection, writing that 'Sydney Smith condensed a volume of dietetic hygiene in his exact statement that "Some men dig their graves with their teeth". The complement of that is found in this: Disease enters

¹Poston, Immunity (xerox), 190

²Roberts, Hygiene, 344

³Watkins, Nutrition, 220

⁴ Characters and Observations p.230

⁵ Buchan, Domestic, p.65

⁶ Cortazzi, Willis, p.182

by the mouth; or, the mouth is the door of disease.⁷ George Orwell wrote that 'I think it could be plausibly argued that changes of diet are more important than changes of dynasty or even of religion.'⁸

The topic is of particular importance in this study. It has been suggested that changes in nutrition are the most likely explanation for the lowered mortality in eighteenth-century England. The thesis was most strikingly put forward by McKeown. Having eliminated all other possible causes, he was left with diet. He argued that the increase in food production in Britain, for instance, 'coincided with a substantial reduction of mortality from infectious diseases and, it is suggested, was the main reason for it.'⁹ The 'great increase in food production', from the end of the seventeenth century, 'toppled the balance in favour of the hosts and against micro-organisms which cause disease.'¹⁰

In principle, this is a plausible argument. We are told that 'McKeown's view that the economic advances which accompanied the industrial revolution eventually led to better nutrition, and that this progressively contributed to a reduction in the prevalence of infections, is epidemiologically sound.'¹¹ But is it historically correct? There are strong counter-arguments. A recent survey and summary of the argument doubts that nutrition is the key. Mercer concludes that 'There is little evidence from indicators of economic standard of living or food consumption per head that improvements in general levels of nutrition occurred in conjunction with the early phases of the mortality transition in England, or in Europe generally.'¹² He further argues that 'even if food supplies became more regular there is little direct evidence concerning any increase in food consumption per head in the eighteenth century, although some estimates are available for the nineteenth century.'¹³ There is 'little firm evidence that the average diet improved dramatically when mortality declined quite sharply and changes in normal levels of food consumption were probably not a key factor in the mortality transition in Europe.'¹⁴ Others have pointed

⁷ Griffis, Mikado

⁸ Orwell, The Road to Wigan Pier, quoted in Appleby, Diet (xerox), p.3

⁹ McKeown, Modern Rise, p.142

¹⁰ McKeown, Rise, p.161

¹¹ Taylor, Infections, p.486

¹² Mercer, Transition, p.169

¹³ Mercer, Transition, p.35

¹⁴ Mercer, Transition, p.152; Razzell, Essays (xerox), p.157 comes to the same conclusion

out that 'We would expect, if food supply was the crucial variable, mortality reductions to be concentrated almost exclusively amongst the poorer sections of the community. Wealthy groups such as the aristocracy should be unaffected if the food supply hypothesis were true, yet one of the most consistent conclusions of recent historical demographic work is that there were marked reductions in mortality in just such groups as the aristocracy.'¹⁵

Given the complexity of the relations between health and nutrition, it is worth looking at the question in a little more detail, especially since other economic historians have also argued for an improvement in nutrition in the eighteenth century,¹⁶ and Malthus implied that a 'more equable distribution of products of the soil' may have been one factor behind the decline of 'plagues, violent diseases and famines.'¹⁷ Furthermore, that diet may be important is suggested in a recent survey by Richard Smith; 'It is generally agreed that these lower elasticities of deaths in England prior to 1750 are to be explained by a better-balanced and perhaps more substantial diet, and a greater choice of substitutes for wheat...'¹⁸

Conclusions.

The nutritional status of a population is not just a matter of food. As well as the right balance between the three prime constituents, proteins, carbohydrates and vitamins, the effects of food will vary enormously depending on other factors. (cf. Scrimshaw & co.) Particularly important is the level and pattern of disease, for many diseases can negate or undermine otherwise adequate diets. Likewise, the demands on the body through physical labour are very important; what is satisfactory for a person who does little physical labour would be inadequate for a miner or ploughman. The climate, body size and weight, seasonal variations and many other factors add to the difficulty of deciding whether an historical population was adequately fed or not. If we add to this the necessarily impressionistic nature of the historical data, it is clear that we will never be certain about the nutritional state of the English population over the centuries leading up to the industrial revolution.

It is thus extremely rash to try to give a diagrammatic representation of the situation. It appears to give solidity and precision to what is necessarily vague and uncertain. Yet it may nevertheless be worth sticking my neck out to try to summarize my feeling for what happened, with the qualification that this is largely conjectural.

Figure 1.

¹⁵Razzell, *Essays* (xerox), 152

¹⁶ Habakkuk, *Population in History*, p.283

¹⁷ Malthus, *Population*, 1, p.315

¹⁸ Smith, *Demography*, p.1676

This summarizes the idea that at a global level, western Europe was a well -favoured area. Within western Europe, north-western Europe was the best and within that Holland and England from the sixteenth were the most highly favoured. Their dietary levels for the middling three-quarters of the population, excluding the over-eating top five per cent and the miserably poor twenty per cent, was probably adequate, especially when compared to the situation elsewhere. This adequacy helps to explain the absence of any obvious correlation between food and mortality.

Figure 2.

This graph makes the point that food availability in itself cannot explain the fluctuations in mortality, for example the rise in mortality in the early period was against a background of rising food availability, and the mortality fall in the middle of the eighteenth century occurred against a background of falling, or at best, level, diet. Yet we cannot for this reason dismiss food as unimportant. This would be a logical fallacy. The constant high level of the English diet was extremely important. It cushioned the English against a great deal of disease and helped make the population energetic and efficient.

Conclusions

The history of food in England and Japan has been very different. Eating patterns have three major consequences. Firstly, in general, the complex mix of vitamins, proteins and carbohydrates influence the effects of disease. Well-fed populations have lower case mortality from many diseases. Secondly, there are more specific nutritional diseases which can be avoided, for example scurvy, beri beri, goitre. Thirdly the storing and preparation of foodstuffs can have a dramatic effects on 'digestive tract diseases'.

The English had a protein-filled diet and indeed some may have suffered some of the health hazards of too rich a diet at times. The Japanese on the other hand had to make up for a deficiency of animal protein by way of vegetable and grain protein. While their diet was thus deficient, they avoided, on the whole, serious deficiencies of vitamins, proteins and carbohydrates, except in the case of the vitamin B deficiency manifested in beri-beri. The dangers from food were minimize by careful attention to storage, cooking, serving and oral hygiene.

We are thus dealing with two reasonably fed populations, certainly well above the levels of the mass of the population in many of their Continental neighbours. This provides an important background factor for over-all health, though it is impossible to show that changes in food patterns directly caused the fluctuations in mortality which we observe. In brief, the diet in England was better and the hygiene in Japan superior, roughly balancing out the effects.

Work.

In order to examine the effects on work of the relative absence of domesticated animals (see APPENDIX), and their potential replacement by other forms of non-human energy from wind and water, let us examine the core activity in Japan, namely the production of rice. Rice, along with other

grains, was by the eighteenth century supporting the densest population in the world, including huge cities and many artisans. How was this achieved?

(APPENDIX - the rice cycle. a-agricult)

If we now move beyond the rice cycle to consider some of the implications of what we have observed, the first point is that, with ample knowledge and ample water and wind, the Japanese were still extraordinarily eager to use human rather than natural power.

(APPENDIX on absence of wheel)

By the eighteenth century, Japan had a productive technology which was in many ways no more efficient in terms of its use of non-human labour than the remotest part of some of the poorest countries today, for instance in the mountains of central Nepal, where I have worked. My description of the technology of the Gurungs, written twenty-five years ago, would apply reasonably well to Japanese agriculture and industry. The Gurungs have a pre-wheel culture in which the human back lifts and moves everything, and the human arm and leg does most of the grinding and pounding. The only non-human power so far utilised is that of oxen in ploughing and residual threshing, and of water mills for a minor part of the grinding...¹⁹ Likewise Japan had a basically pre-wheel technology dependent very largely on the human back and arms for all efforts to wrest a living from a rocky and rather sterile island. How then did the Japanese feed their immense populations? The answer is through incessant physical work and a high degree of co-operation.

The immense pressure put on the human body, possibly unparalleled even in China or India, is widely documented. This has been noted by historians of Japan.²⁰ For instance Thomas Smith writes about a unique farmer's work diary: 'The things that stand out in these detailed entries: the steadiness of the work flow, and the general infrequency of rest days.'²¹ Smith quotes a passage from an (??) eighteenth century advice book for farmers which show the obsession with work and time. 'If the farm family would escape poverty, it must treat time as precious (**koin oshimubeshi**). By rising early and shortening the daily rest period, two additional hours a day can be worked. That is seven hundred and twenty hours a year; the equivalent of sixty days, or two months, when no food is consumed, no wage paid, no oil required for lighting...Thus can the farm family escape the pain of poverty...'²² The gruelling work has been noted by anthropologists. Beardsley and his colleagues wrote that 'By far the largest amount of work is

¹⁹ Population, ch.3 pt.1

²⁰See Saito, e.g. XXX; this is what Hayami has termed the 'industrious revolution', the Japanese alternative to the 'industrial revolution' (see Hayami, Population Growth (xerox), 37)

²¹ Sources, p.210

²² Smith, Sources, p.199

accomplished through human energy in Xliske.' In 1949, an average acre of rice required 870 man hours of labour. This was thirty times more than what it would have required in the United States and one hundred times as much as wheat production would have required in America.²³ The hard work had been noted by visiting agronomists. King's figures of work showed '...something of the tense strain and of the terrible burden which is being carried by these people, over and above that required for the maintenance of the household.'²⁴ He found that 'The Oriental farmer is a time economizer beyond any other. He utilizes the first and last minute and all that are between.'²⁵ He could do nothing but admire, 'This marvellous heritage of economy, industry and thrift, bred of the stress of centuries...'²⁶

It was also alluded to by native Japanese. In the seventeenth century, the author of the 'Millionaire's Gospel' warned that 'In earning his living a man should no more take a moment's respite than does a water-wheel harnessed to a swiftly flowing stream.'²⁷ In the early twentieth century another Japanese author explained that 'The servants are, moreover, expected to work without intermission from morning till night. In some families a fixed time is given them daily for rest; but in most houses no such hour is set apart and they snatch what rest they can in the intervals of their work. They get up early in the morning, about five or half past.'²⁸

Visitors were amazed at how hard the Japanese worked. Kaempfer realized that it was partly the poor terrain which forced the people to work so hard and thought this a benefit. 'But even in this particular nature hath been exceeding kind to this Country: this seeming defect in the soil, this want of culture, is what keeps up in the inhabitants that so much commendable spirit of labour and industry.'²⁹ Thunberg noted in general that 'The diligence with which the husbandman cultivates the soil, and the pains they bestow on it, are so great as to seem incredible.'³⁰ Every tiny scrap of land was used with the utmost care. 'The pains which a farmer takes to cultivate the sides of even the steepest hills, is almost incredible. If the place be even no more than two feet square, he nevertheless raises a wall of stones at the bottom

²³ Beardsley, Village, p.177

²⁴ King, Farmers, p.430

²⁵ King, Farmers, p.261

²⁶ King, Farmers, p.165

²⁷ Sargent, Storehouse, p.140

²⁸ Inouye, Home, p.151

²⁹ Kaempfer, History, p.313

³⁰Thunberg, Travels, iii, 257

of the declivity, fills the part above this with earth and manure, and sows this little plot of ground with rice or esculent rooted vegetables.³¹ Alcock noted that 'Men, women, and children may be seen in the fields early and late, and the labour is chiefly manual.'³² Morse described the work in the grain fields. 'The infinite industry of the people is shown everywhere. In speaking of the planting of their crops I have mentioned the thousands of acres of rice-fields where little bunches of rice-plants are transplanted by hand, but I was not prepared to see the barley, wheat, and buckwheat actually transplanted in rows, and thorough weeding also done by hand.'³³ He noted that 'The extensive rice-fields everywhere indicate the enormous amount of labour involved, not only in making them, but in the yearly amount of labour expended in planting-time.'³⁴ Almost everyone worked almost all the time. 'A few infirm old men and women and little children were seen, but everybody else was at work in the rice-fields or on the farms or busy with duties in the house.'³⁵

The 'duties in the house' were not just household work, but bi-occupations which, as Thomas Smith has shown, were often as important and labour-consuming as agriculture (xxx). Morse described some of these. Having noted the deserted villages, he wrote that 'It illustrates the universal industry of the people. Everybody works; all seem poor, but there are no paupers. The many industries, which with us are carried on in large factories, here are done in the home. What we do by the wholesale in the factories they do in the dwellings, and as you ride through the village you see the spinning, weaving, the making of vegetable wax, and many other industries. In these operations the entire family is utilized from a child above babyhood to blind old men and women.'³⁶

The immense pressure of work is evident wherever we look. There is a moving passage in **Silk and Straw** (qv xxx) in which the fact that women did not even have time to comb their hair in the mornings because of the rush of work is noted. Oral histories of the nineteenth century give other examples. 'One peasant recalled, "We were taught that peasants must work from morning to night in order to stay alive. Whether bad weather caused crop failures or not, we lived believing that it was our predetermined lot to work".'³⁷ A young wife described the attitude of the family she had married into. 'They would complain,

³¹4 nberg, Travels, iv, 83

³² Alcock, Tycoon, 1, p.319

³³ Morse, Day i, p.68

³⁴Morse, Day i, p.10

³⁵ Morse, Day ii, p.51

³⁶ Morse, Day ii, p.51-2

³⁷ Hane ??

"Our young wife takes a lot of time in the toilet", or "She sure takes a long time feeding the baby".⁶⁸ Her mother-in-law (check xxx) reputedly said 'I sure hate to see a young wife wasting her time feeding the baby. She should be working the loom and making some money.' Saito has figures on the hours worked by the Japanese, particularly women, in the later nineteenth century. They appear to work something like twice as long as equivalent groups in western Europe. (xxx)

The effects of this huge amount of physical labour, carried out on a largely vegetable and grain diet, must have been immense. One group who were particularly vulnerable were farm women. They not only had to labour in the fields with men, but had to bear and then suckle children, run the house, and spin and weave. A particularly sensitive account of the lives of working women at the end of the nineteenth century is provided by Alice Bacon. In general 'Journeying through rural Japan, one is impressed by the important part played by women in the various bread-winning industries...'³⁹ They worked in the fields. 'In the rice-field the woman works side by side with the man, standing all day up to her knees in mud, her dress tucked up and her lower limbs encased in tight-fitting, blue cotton trousers, planting, transplanting, weeding, and turning over the evil-smelling mire.'⁴⁰ They worked in the forests. 'In mountain regions we meet the women climbing the steep mountain roads, pruning-hook in hand, after wood for winter fire; or descending, towards night, carrying a load that a donkey need not be ashamed of, packed on a frame attached to the shoulders, or poised lightly upon a straw mat upon the head.'⁴¹ They worked on the tea plantations. 'Then, again, in the tea districts, the tea plantations are filled with young girls and old women, their long sleeves held back by a band over the shoulder, and a blue towel gracefully fastened over their heads...'⁴² They looked after the animals. 'In other parts of the country, in the neighborhood of Nikko, for instance, the care of the horses, mild little pack-mares that do much of the burden-bearing in those mountains is mainly in the hands of the women.'⁴³ They worked at the bi-occupations, particularly textiles. 'In the districts where the silkworm is raised, and the silk spun and woven, the women play a most important part in this productive industry. The care of the worms and of the cocoons falls entirely upon the women, as well as the spinning of the silk and the weaving of the cloth.'⁴⁴ They ran the hotels and tea-houses and worked in them. 'In the hotels, both in the country and

³⁸ Hane, p.90

³⁹Bacon, Japanese Girls, 206

⁴⁰Bacon, Japanese Girls, 206

⁴¹Bacon, Japanese Girls, 206

⁴²Bacon, Japanese Girls, 208

⁴³Bacon, Japanese Girls, 207

⁴⁴Bacon, Japanese girls, 208

in the city, women play an important part. The attendants are usually sweet-faced, prettily-dressed girls, and frequently the proprietor of the hotel is a woman.⁴⁵ All this on top of child-bearing and keeping the house.

The effects of all this immense physical effort on women's bodies was noted most sympathetically by Isabella Bird. She described the effect of work stress on the aging process of women. 'At Kayashima I asked the house-master's wife, who looked about fifty, how old she was...and she replied twenty-two - one of many similar surprises.⁴⁶ 'The married women look as if they had never known youth, and their skin is apt to be like tanned leather.'⁴⁷ She describes the rapid process of ageing elsewhere. 'The girls marry at sixteen, and shortly these comely, rosey, wholesome-looking creatures pass into haggard, middle-aged women with vacant faces...'⁴⁸ She specifically links this to the hard work of women. 'Women with complexions and features hardened by severe work and much wood smoke into positive ugliness, and with figures anything but statuesque.'⁴⁹ At the end of the century another visitor noticed the same rapid ageing of women. 'A Japanese woman loses her beauty early. At thirty-five her fresh colour is usually entirely gone, her eyes have begun to sink a little in their sockets, her youthful roundness and symmetry of figure have given place to an absolute leanness, her abundant black hair has grown thin, and much care and anxiety have given her face a pathetic expression of quiet endurance.'⁵⁰ It is just worth noting that the work was not only long, but extremely heavy; beating, carrying incredible weights, and pumping water.

(insert - put above...)

Work in England.

In assessing the impact of economic developments in these two countries, it is necessary to return again to some wider impressions of those who lived in and visited the two countries over the centuries. If we start with the case of England, we find that, along with Holland, it appears to have been about the

⁴⁵Bacon, *Japanese Girls*, 209

⁴⁶ Bird, *Tracks*, p.100

⁴⁷ *ibid*

⁴⁸ Bird, *Tracks*, p.79

⁴⁹ Bird, *Tracks*, p.87

⁵⁰Bacon, *Japanese Girls*, 101

most leisurely, yet wealthy, society which one could achieve before industrialization. The ease of English production was noted from very early on. Fortescue in the fifteenth century commented that England 'surmounteth all other lands in fruitfulness' and that 'it bringeth forth fruit of it self scant provoked by man's industry and labour.'⁵¹ In the sixteenth century, van Meteren from Antwerp, who lived in England for many years, noted the high standards of living in England. He believed that English wealth came from sheep, rather than from hard labour. He noted that people did not have to work as hard as people in other nations: 'the people are not so laborious and industrious as the Netherlands or French, as they lead for the most part an indolent life like the Spaniards; the most toilsome, difficult, and skillful works are chiefly performed by foreigners, as among the idle Spaniards...They keep many lazy servants, and also many wild animals for their pleasure, rather than trouble themselves to cultivate the land.'⁵² Lupold von Wedel on his visit in 1584-5 commented that 'the peasants and citizens (of England) are on the average rich people', adding that 'I have seen peasants presenting themselves statelier in manner, and keeping a more sumptuous table than some noblemen do in Germany. That is a poor peasant who has no silver-gilt salt-cellar, silver cups, and spoons.'⁵³ Hume notes that 'Lord Bacon, accounting for the great advantages obtained by the English in their wars with France, ascribes them chiefly to the superior ease and plenty of the common people amongst the former.'⁵⁴

From this high level, we know that **per capita** income increased year by year so that a century later, England was even wealthier. Thus we are told that 'The estimates of British national income made in 1688 by the statistician Gregory King set per capita income at a level far above that of modern Asian and African economies (two or three times as high, as nearly as can be determined).'⁵⁵ Defoe described the wealth of the English working classes: '...for the rest, we see their Houses and Lodgings tolerably furnished, at least stuff'd well with useful and necessary household Goods; even those we call poor People, Journey-men, working and Pains-taking People do thus; they lye warm, live in Plenty, work hard, and (need) know no Want.'⁵⁶ These were the people whose affluence was behind the 'consumer revolution' of which Peter Earle has written.⁵⁷ As Defoe explained, 'These are the People that carry off the Gross of your Consumption; Their Numbers are not Hundreds or Thousands, or Hundreds of Thousands, but Millions; 'tis by their Multitude, I say, that all the Wheels of Trade are set on Foot, the

⁵¹ Commendation, 66ff

⁵² Rye, Foreigners, p.70

⁵³ quoted in Appleby, Diet (xerox) p.102

⁵⁴ Hume, Essays, p.157

⁵⁵ De Vries, Economy, p.211

⁵⁶ quoted in Chambers, Economy, p.144

⁵⁷ Earle xxx

Manufacture and Produce of the Land and Sea, finished, cur'd, and fitted for the Markets Abroad; 'tis by the Largeness of their Gettings, that they are supported, by their Wages they are able to live plentifully, and it is by their expensive, generous, free way of living, that the Home Consumption is rais'd to such a Bulk, as well of our own, as of foreign Production...⁵⁸ Defoe concluded that '...in a word the working manufacturing people of England eat the fat, drink the sweet, live better and fare better, than the working poor of any other nation.'⁵⁹

Visitors to England in the eighteenth century were impressed. Benjamin Constant wrote of 'The beauty of the countryside, especially at that time of year, the magnificence of the roads, the cleanliness of the inns, the impression of happiness, good sense and orderliness which the natives convey - all these are a source of continuous enjoyment for any observant traveller.'⁶⁰ The young Frenchman La Rochefoucauld noted the comparative wealth. 'In the eyes of a foreigner Flanders is the province in France which gives the greatest impression of wealth. But, compared with England, is nothing.'⁶¹ As compared to his own country, '...I am inclined to think that the English must be richer than we are; certainly I have myself observed not only that everything costs twice as much here as in France, but that the English seize every opportunity to use things which are expensive in themselves.'⁶² He thought the relative affluence of ordinary English workers to be the result of the political system. 'The simple peasant, who lives in greater comfort than ours, is well clad and has meat for dinner every day. Is not this the result of good government?'⁶³

Later in the century Henri Meister wrote that though the English labourer was better clothed, fed and lodged than the French 'he does not work so hard. You will wonder at this the less, when you consider that the wages of the former are higher, and his diet more substantial; consequently that he has greater strength and activity in the performance of his tasks.'⁶⁴ He was suggesting that the English had moved from the vicious spiral of poverty and were in a virtuous circle whereby they could do the tasks quickly because they had more energy, they could then rest more, and hence have more energy and so on.

⁵⁸ quoted in Chambers, *Economy*, p.145

⁵⁹ Defoe, *Complete English Tradesman*, quoted in Drummond, *Food*, 218

⁶⁰ Wilson (ed), *Strange Island*, 127

⁶¹ Rochefoucauld, *Frenchman*, 116

⁶² Rochefoucauld, *Frenchman*, 30

⁶³ Rochefoucauld, *Frenchman*, 116

⁶⁴ quoted in Marshall, *English People*, p.160

Another visitor in the eighteenth century, Kalm, was also surprised at the wealth and leisure of the poorer labourers. He observed of farm servants, for example that 'as soon as they entered the cottage in the evening, they did not apply themselves to the least work, than that they ate, sat and talked till eleven o'clock in the evening. They never troubled themselves to make waggons, or agricultural implements.' Drinking and gossiping was their common practice, so that he often 'wondered over this, that folk who could only provide food for themselves, their wives and children out of daily wages, could spend time and money in this way.'⁶⁵

There is, of course, a considerable debate as to what happened after 1750. There is a vast amount of literary and historical material which shows that people were forced out of a relatively relaxed work pattern into working much longer hours in terrible conditions. Yet at the same time we should remember that most agreed that English conditions were better than French ones. For example both Malthus and Arthur Young agreed that conditions were far worse in France.⁶⁶ Before the revolution in England wages were seventeen pence a day, in France some ten pence per day. The fact that in England mortality rates did not rise, but actually fell somewhat in the period 1740-1840 is indicative. Between the fifteenth and mid-eighteenth century, England was able to produce very considerable surpluses with an amount of human labour which amazed outsiders. It was a relatively affluent country, second only to Holland, but with a much larger and more diverse population. This was the base from which it launched into rapid urbanization and industrialization, a process which paradoxically increased the need for human labour to service the new 'labour saving' machines. For two or three generations people worked long and gruelling hours in the conditions so well described by Chadwick and others. Stendhal in the middle of the eighteenth century 'felt at once the absurdity of the eighteen-hour day of the workman.'⁶⁷ He added that 'My companions thought me quite mad when I added: the excessive and crushing toil of the English workman avenges us for Waterloo and four coalitions.'⁶⁸ At their most exhausting, these began to approach the conditions which were customary in most peasant societies through the centuries.

One result of a diet relatively rich in protein can be noted. Human beings need a certain amount of energy to work. If they eat a protein-rich diet, then they can eat infrequently. If they depend on a largely vegetarian diet, where much of the protein comes through grain in the form of rice, bread, maize, or whatever, huge amounts have to be eaten. Harrison had half seen this, when he compared the relatively small chicken meal of an Englishman, with the huge amount of salad and bread that an Italian in the sixteenth century needed to eat. The frequency of eating is an index of the richness of the diet. If the English diet was as good as contemporaries suggest, the English should not have had to eat often.

The evidence suggests that in the sixteenth century, there were only two, or at the most three, main meals. The doctor Andrew Boorde thought that people 'resting' would have two meals a day, while

⁶⁵ Marshall, *People*. p.193

⁶⁶ Malthus, *Population*, i, 230-31

⁶⁷Wilson (ed), *Strange Island*, 165

⁶⁸Wilson (ed), *Strange Island*, 165

labouring folk would have three.⁶⁹ Another doctor described two meals a day as normal, a 'dinner' at about 11 o'clock and supper at any time from five o'clock onwards.⁷⁰ Harrison gives the fullest details, describing how 'each one in manner (except here and there some young hungry stomach that cannot fast till dinnertime) contenteth himself with dinner and supper only.' He further writes that 'With us the nobility, gentry and students do ordinarily go to dinner at eleven before noon and to supper at five, or between five and six at afternoon. The merchants dine and sup seldom before twelve at noon and six at night, especially in London. The husbandmen dine also at high noon, as they call it, and sup at seven or eight...'⁷¹ There may also have been a not insubstantial 'breakfast' at six or seven in the morning.⁷² As we have seen, Fynes Moryson noted that while the French ate four times a day, the English only ate substantial meals twice a day⁷³ and a century later De Saussure wrote that 'Dinner is taken at two or three o'clock, sometimes even later, and there is no supper.'⁷⁴ From at least the sixteenth century to the present, the structure of meals has remained basically the same. There is a relatively light 'breakfast' a mid-day 'dinner' and an evening 'supper'. This is perfectly suitable with a high protein and high calory diet such as that of twentieth-century urban dwellers. That it should be enough for a mainly rural, pre-industrial population tells us a good deal about the quality of the diet. The contrast with Japan, as we shall see, is particularly striking.

Vitamins, are a subject which need further investigation. It may well be that there was some improvement here. It is difficult to be certain of how widely available fruit and vegetables were in the medieval period. (to add Dyer here XXX) Drummond thought that there was a shortage of vegetables, but that the situation improved during the sixteenth and seventeenth centuries.⁷⁵ The rapid extension of fruit and vegetable growing in the later seventeenth and early eighteenth century is documented by Joan Thirsk. She quotes, for example, Sir William Coventry who 'summed up the essentials in the situation in 1670 when he described "the increase of the use of fruit, herbs and roots, especially near all great towns, whereby an acre of garden will maintain more re than many acres of pasture would have done".'⁷⁶ Yet even a century later Rochefoucauld thought that 'The English do not eat half as many

⁶⁹ Boorde, Regiment, p.251

⁷⁰ Cogan, Haven, p.185-8

⁷¹ Harrison, Description, p.140-44

⁷² Byrne, Elizabethan Life, p.30; Drummond, Food, p.60

⁷³ Moryson, Itinerary iv, p.138,173

⁷⁴ De Saussure, England, p.223

⁷⁵ Drummond, Food, 18,19,27-9,117-8

⁷⁶ Thirsk, Horticulture (xerox), 301

vegetables as we do. Consequently their kitchen gardens are quite small in comparison with ours.⁷⁷ For instance, George quotes an authority on scurvy who wrote in the early nineteenth century that one of the major improvements had been 'the increased use of fresh provisions and the introduction of a variety of vegetables among the ranks of the people.'⁷⁸

⁷⁹Some of the changes were noted by Adam Smith in the 1760s. 'Not only grain has become somewhat cheaper, but many other things, from which the industrious poor derive an agreeable and wholesome variety of food, have become a great deal cheaper. Potatoes, for example, do not at present, through the greater part of the Kingdom, cost half the price which they used to do thirty or forty years ago. The same thing may be said of turnips, carrots, cabbages; things which were formerly never raised but by the spade, but which are now commonly raised by the plough. All sort of garden stuff too has become cheaper. The greater part of the apples and even of the onions consumed in Great Britain were in the last century imported from Flanders.'⁸⁰ Certainly doctors were aware by then that a good diet was necessary to cure the dreaded disease of scurvy. Buchan wrote at the same time, 'The most obstinate scurvy has often been cured by a vegetable diet; nay, milk alone will frequently do more in that disease than any medicine. Hence it is evident, that if vegetables and milk were more used in diet, we should have less scurvy, and like-wise fewer putrid, and inflammatory fevers.'⁸¹ Although it may be that the diet of the lower classes in the late eighteenth century was only returning to the level of the same groups in the later sixteenth century, this was a tremendous achievement given the rapidly increasing population. If agricultural improvements, marketing and transport improvements kept nutrition as good as it had been in earlier centuries, this is so unexpected and contrary to the Malthusian predictions that we should note the effects.

Diet in Japan.

The combination of beans and pressed flowers was enormously important. Roberts has outlined some of the advantages of soya. 'Soya bean flour contains 40 per cent of protein of good quality, at least equal to that of whole wheat and superior to the proteins of white flour and to those present in peas and ordinary beans. It also contains the essential amino-acids in nearly optimum proportions for animal

⁷⁷Rochefoucault, Frenchman, 46

⁷⁸ Marshall, London p.69

⁷⁹ George, London Life, p.98

⁸⁰ Smith, Wealth, i, p.87

⁸¹ Buchan, Domestic, p.66

nutrition. It has a fat content of 20 per cent and in consequence has a high calorific value - about 470 calories per 100 grammes, as compared with 370 for white flour.⁸² In some of its derivatives, 'the nutritional value to the protein has been shown to be equivalent to that of the protein in cow's milk.'⁸³ Furthermore 'pulses as a class are good sources of the B group of vitamins (except riboflavine). More important, the greater part of these vitamins present in the harvested seeds is actually consumed.'⁸⁴ Davidson concludes that 'A combination of pulse and cereal proteins may have a nutritive value as good as animal proteins.'⁸⁵ This takes us to those cereal proteins which were necessary to complete the diet.

Although it is less efficient for this purpose, 'clearly the protein intake from rice, barley and wheat was of utmost importance during the middle of the nineteenth century.'⁸⁶ It is estimated that eighty per cent of the protein in Japanese diets in the second half of the nineteenth century came from these grains. The amount coming from soybeans was surprisingly small, only about five to six grams out of a total of forty-five to fifty grams per day.⁸⁷ The type of grain which was eaten varied by region, period and class. For instance, we are told that 'During both the Tokugawa and the Meiji period, the staple consumed varied by region. In the westernmost parts of Japan, people ate a higher proportion of mugi (wheat and barley) and sweet potatoes, while people in the mountainous areas ate more millet and hie (deccan grass).'⁸⁸ Rice was the preferred food but many could not afford it. 'Every one lives on it who can afford to do so; but as a rule, the peasantry cannot. Wheat, barley, and especially millet, are the real staples throughout the rural districts, rice being there treated as a luxury to be brought out only on high days and holidays, or to be resorted to in case of sickness.'⁸⁹ For instance, at the start of the twentieth century, it was estimated that 'In most parts of Japan the grain food of the labouring people is about seventy per cent naked barley mixed with thirty per cent of rice, both cooked and used in the same manner.'⁹⁰

⁸²Roberts, Hygiene, 386

⁸³Davidson, Nutrition, 179

⁸⁴Davidson, Nutrition, 179

⁸⁵Davidson, Nutrition, 179

⁸⁶ Jansen; Rozman (eds.), Transition, p.437

⁸⁷ Jansen; Rozman (eds.), Transition, p.437

⁸⁸ Jansen; Rozman (eds), Transition, p.455

⁸⁹ Chamberlain, Things, p.21

⁹⁰ King, Farmers, p.379

The class division is shown by a study of Tokyo in the 1860s and 1870s where 'Ogi Shinzo found an essentially rice diet, with the middle and upper classes eating rice and the rest of the population eating rice extended with other grains.⁹¹ When it could be obtained the rice was thought to be extremely good, with a special flavour, extra nutritious and long lasting. 'There are several varieties of Rice grown in the Country. The best sort hath not its equal in the Indies. It is perfectly white, like Snow, and so nourishing and substantial, that Foreigners, who are not used to it, can eat but little of it at a time.'⁹² Kaempfer noted that 'The Japanese rice accordingly is esteem'd the best of all Asia, particularly what grows in the Northern Provinces, which will keep many years, and which for this reason they chuse to fill their Store-houses withal, having first wash'd it in muddy water and then dried it.'⁹³ Thunberg also believed that 'The rice in this country is accounted the best in all the east Indies and is extremely white, glutinous, and more nutritive than any other.'⁹⁴

What is clear is that whatever the grain, it was from this that the Japanese had to draw most of their nourishment, both carbohydrates and proteins. As Hanley puts it 'in the Meiji period, as in the decades and centuries preceding it, the dietary staple was grain, rice being the preferred grain. The purpose of side dishes was to enhance the taste of the staple grain; they were not considered basic foods themselves.'⁹⁵ It is only possible to extract enough protein from grains for the really exhausting physical labour which was common in Japan by eating a huge amount - far more than human beings would normally do. This led to an attitude towards eating which puzzled and intrigued foreign observers.

As Griffis travelled on the river from Osaka in 1871, he watched the men who, with enormous effort, punted the boat with long poles. 'After a hard night's toil, poling and walking in a nipping frost, I wished to see the breakfast by which they laid the physical basis for another day's work.' He had heard rumours that the Japanese must eat some secret form of protein, rats or mice - 'The daily ration of a Japanese labourer was one mouse per diem; so I was once told in America.' But he noted that 'I never saw or heard of such animals being eaten during all the time I was in Japan.' Nevertheless he was on the look-out 'for some stimulating food, some piece of flesh diet to be eaten by these men, who had to make muscle and repair the waste of lubricating their joints.' What he observed was as follows. 'The first course was a bowlful of rice and a pair of chopsticks. In the second course history repeated itself. Third course was a dipperful of tea...the fourth course was a bowl of rice and two slices of radish; the

⁹¹ Jansen; Rozman (eds.), *Transition*, p.458

⁹² Kaempfer, *History*, 1, p.187

⁹³ Kaempfer, *History*, 1, p.186

⁹⁴ Thunberg, *Travels*, iv, 85

⁹⁵ Jansen; Rozman (eds.), *Transition*, p.457

fifth was the same. A dipperful of tea-liquor finished the meal, and the pole was resumed.⁹⁶

Food had to be eaten constantly to replenish the energy. As one Japanese author pointed out 'There is certainly far greater sustaining power in European food, and our medical authorities urge a more extensive use of animal food besides fish. Rice and vegetables, it is true, fill the stomach; indeed, one may even feel surfeited, and yet in a short time the strain disappears and hunger returns. For this reason coolies and others engaged in severe physical labour take four or more meals a day.'⁹⁷ Pompe also noticed the need for frequent eating. 'Diet is as a rule very simple, but insufficient for those who do heavy work. Rice is the staple food and is eaten three or four times a day. Usually the Japanese put some rice in a cup, pour some weak tea on it, and gulp this mixture down accompanied by strange noises.'⁹⁸ Some people ate even more frequently; 'Japanese farmers even five or six times a day...' wrote Morse.⁹⁹ Pompe also noted the irregularity and frequency when patients came to hospital. 'The food was very good, but it was hard to accustom the Japanese to having their meals at fixed times. It is their custom to eat as soon as they are hungry, and boiled rice is almost always available.'¹⁰⁰ Arnold explained that 'Rice is the mainstay, and a huge quantity of it is always kept ready boiled, needing only to be warmed up or mixed with hot tea.'¹⁰¹

The rice was cooked in a special way, perhaps to help speedy digestion. The manner in which it is cooked makes it exceptionally palatable and nutritious, quite different from the Indian process which leaves each grain separate and dry.¹⁰² The way in which the rice was cooked may also, perhaps deliberately, have had important nutritional consequences. Davidson points out how much can be lost in the preparation of rice. 'Rice, as purchased in any bazaar, has to be washed and this washing water must then be discarded. The rice is then cooked in water and this cooking water is usually discarded, though it is sometimes consumed...the losses of thiamine particularly may be very high. Similar losses of nicotinic acid also occur. It is probably a safe assumption that for rice half of the water-soluble vitamins which escape the millers are washed away by the housewife and so lost to her family.'¹⁰³ The fact that

⁹⁶ Griffis, Mikado, p.409-410

⁹⁷ Inouye, Home, p.75

⁹⁸ Wittermans, Pompe (xerox), p.52

⁹⁹ Morse, ii, p.354

¹⁰⁰ Wittermans, Pompe (xerox), p.105

¹⁰¹ Arnold, Seas, p.402

¹⁰² Cahmberlain, Things,

¹⁰³ Davidson, Nutrition, 212

Japanese rice is left in a very wet state, the water not poured away, may indicate that some of this loss was avoided.

There were two problems caused by this constant need for huge amounts of rice. One was that if one is eating much of the time in order to have the energy to do the work, when is one going to have the time to work? The Japanese solution was to gobble down food very quickly. As we have seen, Pompe noticed the 'gulping down' of a mixture of tea and rice, which made it go down quicker, an addition of tea which is also noticed by Griffis as occurring between courses. Isabella Bird noted that the raw fish and pickled vegetables were 'all bolted with the most marvellous rapidity, as if the one object of life were to rush through a meal in the shortest possible time.'¹⁰⁴ As Chamberlain observed 'Another detail which will impress the spectator less favourably is the speed at which food is absorbed. In fact, some classes - the artisans in particular - seem to make a point of honour of devoting as little time as possible to their meals.'¹⁰⁵

One of the most detailed accounts comes from a town near Tokyo. A woman was remembering her childhood in the first quarter of the twentieth century. Country girls used to come into the sewing school and the mistress would tick off girls for gobbling their food. 'The trouble was that country girls, who were made to work in the fields from a very early age, had learned to eat their meals as fast as possible so they could get straight back to work; otherwise they were told off by their parents...A girl needed at least two large bowls per meal to keep her going, so she had to get used to stuffing it in. In fact, when matchmakers came around looking for suitable brides, one of the things they took particular notice of was the girl's appetite: if she really gobbled her food down she'd make a good farmer's wife, they said.'¹⁰⁶ In Tokyo itself, breakfast, 'does not take more than ten or fifteen minutes; indeed, people pride themselves upon their quickness at meals, especially at breakfast, as it implies that they have no time to dawdle over their food which is taken solely to ward off hunger and maintain their health and strength.'¹⁰⁷

It looks as if this may have caused some peculiar developments in the Japanese physiognomy. It was suggested that they had become somewhat like many herbivorous animals, which have to spend much of their effort extracting sustenance and which develop complex and large intestinal systems. This was noted by Morse, who claimed as a professional zoologist, that 'It has been ascertained by actual measurement (so Takenaka, who is a medical student, informs me) that the Japanese stomach is larger than that of foreigners; this may have been caused by the large amount of rice they consume. It is amazing to see in the country little children with abdomens roundly distended by the quantity of rice with

¹⁰⁴ Bird, *Tracks*, p.100

¹⁰⁵ Chamberlain, *Things* p.181

¹⁰⁶ Silk, p.141

¹⁰⁷ Inouye, *Home*, 62

which they have literally stuffed themselves.¹⁰⁸ At first, a visitor might have imagined that the children were suffering from **Kwashiorkor** or some deficiency disease which distended their stomach. Morse believed, that it was due to the fact that they were being trained to eat vast amounts of grain in preparation for the time when they would need that energy in the fields. 'The abdominal, and I might say the abominable, protuberance often seen in little children and infants is astounding; it seems as if it would pain them; indeed, they looked as if they had been stuffed for the oven. It comes from gorging themselves with rice, which actually distends the walls of the stomach.'¹⁰⁹ There were certainly some deficiencies in the diet, but it seems likely that it was the problems of digesting and converting huge quantities of grain that led to the distortion, which tended to disappear in adults as they worked harder and used the energy.

How then would we evaluate the nutritional level of the majority of the Japanese population over the centuries? As Hanley concludes 'From the evidence available, it is possible to argue either that the Japanese had a very poor and boring diet in the Tokugawa period or that the diet was rich and varied.'¹¹⁰ It is particularly difficult to find out 'how much of each kind was eaten or what the daily calorific intake was.'¹¹¹ We know that every possible piece of land was used for food. In the late seventeenth century Kaempfer described how 'Every inch of Ground is improv'd to the best advantage and it was not without great admiration, we beheld on our Journeys to and from Court, Hills and Mountains, many inaccessible to Cattle, which would lie wholly neglected in other Countries, cultivated up to their tops.'¹¹² The Japanese ate almost everything. 'Little can be thought of, but what appears at their table in some dress or other. Many things, despised by other nations, make up part of their desert and most delicate dishes.'¹¹³ They seemed able to live on humble food. 'The Japanese are very industrious, and endured to hardships. Very little will satisfy them. They generally live on plants and roots, tortoises, shell-fish, sea-weeds and the like.'¹¹⁴

One group of scholars and observers have argued for dietary defects, in particular pointing to certain key deficiencies. The English doctor Willis pointed out 'that butter and milk would be a very useful

¹⁰⁸ Morse, Day ii, p.354

¹⁰⁹ Morse, Day i, p.155

¹¹⁰ Hall (ed.) Cambridge History, iv, p.686

¹¹¹ Rozman (ed.), Transition, p.453

¹¹² Kaempfer, History, 1, p.186

¹¹³ Kaempfer, History, 3, p.314

¹¹⁴ Kaempfer, History, 3, p.312

addition to the sweet potato which formed the ordinary diet of the poor people.' He stressed that 'a mixed diet, one partly vegetable and partly animal, is best suited to the requirements of the human body and the one best suited to the capabilities of this province to produce food for its inhabitants.'¹¹⁵ A few months later he wrote 'It is the duty of the undersigned to speak plainly and to tell the Government that the standard of health and vigour of the inhabitants of this province and indeed throughout Japan falls short of what it should be.' One of the chief causes was, he thought, 'the comparatively poor diet of the population generally.'¹¹⁶ Certainly visitors from the better fed western middle classes in America or Britain were surprized at how meagre the diet seemed to be. They noted that for many 'even rice was something of a luxury.' As Bird wrote, 'The shops, such as they are, contain the barest necessities of life. Millet and buckwheat rather than rice, with the universal **daikon** (radish) are the staples of diet.'¹¹⁷ This thin diet continued up into the 1930s. A newspaper reporter then described the daily meals of a typical family of tenant farmers in western Japan as consisting of 'rice gruel and pickles for breakfast; rice gruel, dregs of soybean cakes, and pickles for lunch; and rice mixed with barley, vegetables and pickles for supper.'¹¹⁸

Ironically, however, it appears that two of the major health problems were caused by the preparation and eating of too much of the food with the highest status, white rice. One was calcium deficiency. The absence of meat and eggs in the diet could be offset by eating cheaper grains. Morse noted that 'It is said that injuries and fractures of the bones heal very slowly and often imperfectly. Rice has but half the ash material of wheat, and the water does not supply sufficient inorganic matter necessary for the bones.'¹¹⁹

Equally important was the spread of a curious wasting disease which was finally traced to a particular inadequacy in the diet. This was beri-beri, or **Ka-Ke** as it was known in Japan.

(APPENDIX on beri-beri - a-beri).

Returning to the question of the over-all dietary quality of food in Japan, a thoughtful attempt to estimate whether the diet was inadequate in terms of energy during the second half of the nineteenth century has been made by Hanley. She gives figures suggesting 'the growth from 1,664 Kcal in the 1840s to 1,902 Kcal in 1887.' Given the size and weight of the Japanese population, she believes that 'A diet providing 1,700 - 1,900 Kcal and 45-50g of protein might keep the physique of the Japanese

¹¹⁵ Cortazzi, Willis, p.181

¹¹⁶ Cortazzi, Willis, p.181

¹¹⁷ Bird, Tracks, p.128

¹¹⁸ Hane, p.41

¹¹⁹ Morse, i, p.40

people within certain limits, but was not insufficient for the Japanese of that era.' ¹²⁰ She adds that 'Taking everything into consideration, 2,000 Kcal per day per capita was not a low nutritional standard in 1887. Further, the survey data do not include consumption of unrefined sake, consumed by farmers, which could have provided additional calories needed for hard labor.'¹²¹ In conclusion, she believes that not only had there probably been an increase in the amount of rice consumption over the Tokuyawa period, ¹²² but that the evidence as a whole shows 'the adequacy of the diet and its long-term stability over a critical half-century of transition.'¹²³ This was the view of Chamberlain at the time. 'Experts say that Japanese food, though poor in nitrogen and especially in fat, is rich in carbon and amply sufficient to support life, provided the muscles be kept in action, but that it is indigestible and even deleterious to those who spend their time squatting on the mats at home.' (ref.xxx)

We have concentrated on the dietary aspects. They provide an essential foundation for reasonable health. The Japanese evidence, combined with what we learnt about famine patterns, suggest that Japan scraped by. It was a small, rocky and inhospitable volcanic island with a very large population. People avoided foodstuffs from domesticated animals but worked the grain fields with enormous skill and diligence and harvested the forests and waters with minute care.

¹²⁰ Jansen; Rozman (eds.), Transition, p.445

¹²¹ Jansen; Rozman (eds), Transition, p.442

¹²² Cambs, Hist, iv, p.681

¹²³ Jansen (ed), transition, p.446