(written August 1995)

THE ROOTS OF AN IDEA: PART ONE. 1962 TO 1976

It is not too difficult to date the start of this story. The theme of the relationship between population and resources seems to have been one which I have pursued off and on for all of my adult academic life. My first memory of being really excited by the problems behind 'Savage Wars' was in my third year as a history undergraduate at Oxford in 1962/3, when I wrote a long essay titled 'What does one mean by the term "Industrial Revolution"?' I have this essay in front of me now and note the following sections in it which, some thirty years or so ago, foreshadow some of the themes explained in 'Savage Wars'. Since this is my very first encounter with a problem which I am still trying to work out thirty years later, and since I am engaging in an archaeology of knowledge, it is perhaps worth including the section on the demographic situation and industrial revolution in England.

In discussing the question of the labour force needed for the industrialization I wrote: *'Miss George in her article "Some causes of the increase of population in the eighteenth century as illustrated by London" says that the "'Bills of Mortality' show that London shared in the general prosperity from 1700-1757-65, which is considered to have been one of the chief periods of English working class prosperity." If this is true it may well have been an important factor in the Industrial Revolution for it would have the double effect of allowing earlier marriage and hence increased population (as well as better nutrition contributing to longer life etc) and of creating a large market for the new industrial goods*.' I then cited the work of Chambers in 'The Vale of Trent' and Mingay's work on the 'Agricultural Depression 1730-50' in support of the argument that there was an improvement in the standard of living. We then have here the germ of an idea that earlier marriage (rising fertility) and better nutrition (lower mortality) may have been factors behind the rapid rise in eighteenth-century population.

But why did I think the whole question of the relation between population and resources were important at all?

'At this point we arrive at the crucial problem in relation to the Industrial Revolution - was demographic expansion a cause or result of the Industrial Revolution? From the answer we give to this is likely to spring our whole ethical evaluation of the Revolution - for if we conclude, with Aston and others, that population was expanding rapidly anyhow and that hence England was only saved from the fate of Ireland by its economic growth we may be prepared to forgive many of the horrors of the change to industrialisation - but if, with most nineteenth-century historians, we see the population increase as a response to industrial labour demand we are likely to view the Revolution as an unparalleled tragedy, even if we admit that statistical tables show that real wages of factory workers, were as high or higher in the nineteenth century than farm labourers had been in the eighteenth century.'

Thus I saw it as an ethical, as well as intellectual question. The shortage of space forced me to be brief in the ensuing discussion. I asked myself two questions:

'was it increase in the birth rates or decrease in the death rate which caused the population explosion - and what was the cause of the change? It is evident that, since it is fairly certain that whatever improvement there was in medical or nutritional standards in the century this had little part in the fall in the death rate, only the birth rate could have been affected by industrialization - so those who decide for a level of a lowered death rate exclude the possibility of industrial expansion causing the rise. Here are the conclusions of the authorities.'

The logic here is a little convoluted. What I seemed to be saying was that only those who thought the principal cause of population growth was a rise in the birth-rate could claim industrialization as the **cause** of the population boom, rather than a consequence. I produced two tables summarising the work of fifteen authorities half of whom thought it was due to a rising birth rate, the other half concluded it was down to a falling death rate..

I added a note that *'Necessarily this is a bald summary of these author's conclusions and most of them emphasize the complexity of a problem in which there is so much interaction between cause and effect.'*

What then was my reaction to what was evidently a very balanced disagreement between historians by the year 1962?

'My own conclusion is based on a negative approach. Although it is statistically obvious that during these crucial years there was a fall in deaths and a rise in population there is no satisfactory explanation of either. As far as falling death rate is concerned there is no strong evidence for improved medical faculties or improved living conditions either existing or - if they existed at all - having much effect on a fall in the death rate. On the other hand there are no obvious reasons why birth rate should rise - for it too was governed by these factors. The only explanation seems to be a much more problematical one - to which there were two aspects.

One was the long-term population cycle suggested by Chambers in which a period of disease and crisis was followed by a rapid increase in births, a lowering of the age composition of the country leading to a lower mortality rate, leading to population expansion. This suggestion is strengthened by comparison with Ireland and the continent where this process was in motion. But there were two special factors which applied at this time. One was the change in the virulence of disease hinted at by Helleiner, Kitson Clark, Connell, McKeown and Brown and elucidated by Saltmarsh - this aggravated the population increase. So far, it seems, England would have shared Ireland's fate - tho' different social and political conditions might have restrained it from going as far as her. So thus we can see the population increase as divorced from industrialization, and even from economic expansion of the previous centuries - and therefore as a dynamic cause of the industrial revolution. Though here again one must remember that in nineteenth-century Ireland or twentieth-century India population pressure does not necessarily result in industrialization.

Such a view, a conclusion which sees the population growth as largely caused by others than industrial factors is emphasized when we remember that during the steepest period of population growth 1780-1815 industry still produced, compared to agriculture, a very small proportion of the country's wealth and employed a very limited amount of the country's population. It seems to have been, since country districts were ***not*** *depopulated as we have seen, a surplus agrarian population which industry employed. But even here we have to be careful not to see too close a link between population pressure and industrial growth - the pioneering work for the revolution was done in a period when inventions were made largely because of a shortage of labour. When all this is said, however, it is still true that industrialization was a major factor in continuing the expansion of population during the nineteenth century by employing and even enriching the already increased workers. Comparison of Ireland and England in the 1840s shows the value of industry as a factor in* ***maintaining*** *population increase.'*

With the benefits of thirty years of hind-sight, various things can be said about this, my first contact with a problem which I am now wrestling with again. Firstly, I still remember my excitement at discovering a problem which was so clearly mystifying some notable historians. The problem was obviously a very important one, yet all efforts to solve it had largely failed. Even the basic question of what caused the population rise was hotly contested.

There was another intriguing mystery. It seemed obvious that mortality was dropping, yet all the theories to explain **why** this happened were clearly inadequate. To summarize the situation as I saw it at that time, the arguments put forward to account for the falling mortality were mostly flawed. The theories were as follows. 'Higher living standards' (Ashton, Trevelyan, George, Saltmarsh, McKeown and Brown) seemed to be important, but what these were was left vague. Of particular medical changes the disappearance of plague was mentioned (Helleiner, Kitson Clark, Connell, Saltmarsh), though it was not clear why this had happened. Others suggested changes in the habits of lice (Connell), better nutrition (Trevelyan, Habakkuk), absence of war (Kitson Clark), hygienic improvements (Marshall), medical improvements (George, Trevelyan), a change in the virulence of disease, which, as I stated, was hinted at by several authors. Yet it was all very messy. People appeared to be circling round a large problem, yet unable to resolve it - better at knocking down theories than building them up. For instance, it was possible for a good undergraduate to show that the decline of plague had happened too early (it disappeared two generations before the rapid growth of population); that no **evidence** of viral changes was given; that the medical improvements were insignificant, with the possible exception of smallpox inoculation, that the nutritional improvements were very questionable, as was hygienic improvement. There was thus a great mystery - as yet unresolved. My later work is a development out of this embryo of puzzlement towards the current 'Savage Wars of Peace'.

Then there was the puzzle of fertility. An almost equal number of authors believed that this was the crucial variable. But what **caused** the rise in fertility? The only reasons given were that it was due to the same rising living standards (including nutrition), which affected fertility (in particular a higher marriage rate). This was the view of Chambers, Habakkuk and others. Yet again the arguments and evidence seemed weak and inconclusive. It was a puzzle. Yet as an undergraduate one has the frustrating fact that after a week or two on a topic, having discovered the puzzle, one whisks on to another completely different topic. So my initial puzzlement lay, to a certain extent, dormant. The seed was sown, however, and 'The Savage Wars of Peace' is, in many ways, the flower of this first encounter.

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Part of the problem was that the data on mortality, nuptiality and fertility was so poor, based on aggregative analyses from parish registers and infrequent censuses. Little known to me at that time, the French were developing a new demographic method, 'family reconstitution' which, in the hands of Louis Henry and his school, would transform our understanding of the past. I remember first hearing of this work on a walk round the Parks in Oxford with Charles Phythian Adams in about 1964. After graduating, I decided to write a Ph.D. on witchcraft, and it was only then that I came into contact with original records. Just at that time I heard from Charles of the application of the French methods by Tony Wrigley and his colleagues at the Cambridge Group. Simultaneously with this famous work on Colyton, Peter Laslett's book **The World we have lost** (published in 1965 (XXX), opened up the world of social history, and in particular revealed the value of listings of inhabitants. John Hajnal's famous article on 'The European Marriage Pattern', also published in 1965 was also of enormous importance. It was an enormously exciting time, when historical demography, anthropology, original documents all mixed together to make a new sort of social history possible. The puzzles I had encountered could now be approached with the possibility of a definitive solution. Although I was largely engrossed in learning anthropology, first alongside my D.Phil on witchcraft, and later when I went to the L.S.E. to do a two-year M.Phil, it is clear that, as I showed in my book on Ralph Josselin, drafted in 1967/8 (and particularly an appendix on fertility) I was still very interested in these topics.

The two pressures are well caught in the following published answer I gave to Vinay Srivastava when he asked me in 1988 why I did not go on with my work on witchcraft, but decided to do my Ph.D. in

anthropology and population instead.[1]

'At the end of the two years taught Master's, I decided that I wanted to do a Ph.D. and by that time several things were happening in the world. One was that the late 1960s was the time, like the present, of acute ecological concern. It was the time when not only the Vietnam War was going on, but also many people were worried about what they called the 'population bomb'. Paul Ehrlich and many others were writing books with that title. And so there was a general concern, suddenly beginning to be realized, that the world's population, instead of decreasing as they thought would happen, was rising. There were tireless warnings about the ecological effects and of the economic and social effects. Everyone was worried about population at that time. So that was the general background. More particularly within history, the most exciting work was being done in population history. New techniques and methods were being developed in France and England, and elsewhere, to subject list of inhabitants in parish registers to detailed demographic analysis, and paint a new picture of the past based around rise and fall of population. So, both intellectually and in terms of what we were talking about, it was an exciting topic. So, I already had the idea before I went to Nepal that I would do something on the relationship between population and resources.'

This double interest, practical (missionary) and theoretical and methodological is well shown by the very first piece I had published (apart from in school magazines). This was when I was already 27, in an article on 10 October 1968 in **New Society** entitled 'Population Crisis: Anthropology's Failure', whose theme was summarized as: 'Population growth is much more than a question of contraception. A whole set of social attitudes are involved, which need investigation.' The apocalyptic tone is shown in the first sentence. *'We are rapidly moving towards a population catastrophe which will make past plagues and two world wars seem insignificant by comparison.'* The rest of the article was a literature survey, showing the inadequacies of anthropological treatments, drawing attention to the work of Laslett and Wrigley. This work, I said, was already changing our perception of the population history of England. *'We are discovering that there was birth control in Stuart England: that Europe had a "unique marriage pattern", combining high age at marriage with a large proportion of never married persons; that the small "nuclear" family predominated in most of the pre-industrial west: that one of the major factors permitting the accumulation of capital and hence industrial expansion in the late eighteenth century was late marriage and the consequent **slow** population growth - roughly one quarter of 1 per cent per annum in the 200 years before industrialization.'* It is noticeable that in this summary almost all the attention was switched to the role of fertility and marriage. This may have been related to my growing interest in marriage and sex - about which I was writing indirectly in a long M.Phil dissertation on incest in early modern England.

What then, in 1968, did I think were the major puzzles to be solved in the field of historical population? I listed them in my article as follows. 'Why were there such differences in pre-industrial fertility decline between different groups and different areas? Why did the fertility of the British peerage fall steadily between about 1620 and 1740? Why did so many people remain unmarried? Why was marriage age so high - between 20 and 30 for both men and women - and what consequences did such a marital structure have on sexual norms? Why was birth control introduced in parts of eighteenth-century France and what methods were used to limit families in seventeenth-century England? Why did plague die out in England in the seventeenth century when mortality from other diseases was rising and when there had been no significant advances in medical techniques for dealing with epidemics?' Only the last of the six questions concerned mortality. The first five were to do with fertility and nuptiality and the answering of them would be at the heart of several articles I wrote in the 1970s and 1980s, and in particular my book on **Marriage and Love in England** (1986).

[1]Interview, p.59

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Population had now become my central interest. I attended demography lectures (by Professor David Glass and Chris Langford) at the London School of Economics, as well as some seminars. Christ Langford became a personal friend and helped me at several stages with my Ph.D. I did not want to become a technical demographer, but needed to know enough to be able to devise questionnaires and censuses. Demography was the central feature of my 15 months of fieldwork in Nepal 1968-1970 and I was able to see birth, marriage, death and disease in a direct way which is not possible for a historian or inhabitant of a western society.

During this work my main interest was again focused on fertility. My final book on Nepal had three chapters on fertility and only one on mortality. A chapter on illness in the original thesis was left out and published later and separately.[2] It was clear that my central interest had moved towards the social and other determinants of fertility. In contemporary Nepal the questions concerning the decline of mortality were not apparently difficult to solve, at least over the last twenty or so years when there had been a marked decline in mortality, largely caused by improvements in public health (water pipes and vaccination campaigns). The longer term changes, however, were more puzzling and it is in considering these that I developed my first serious hunches about the possible answers to a few of the mortality mysteries I had encountered as an undergraduate about ten years earlier. In this process I also started to devote serious attention to the two main theorists in the field of the relations between population and resources, namely Malthus and Boserup.

It is in the last chapter of the book entitled 'Resources and Population: some general models' that I tried to take my understanding further. One of the central puzzles was that *'The population of Nepal has more than trebled in the years between 1850 and 1960...This growth has occurred despite the absence of significant medical improvements before 1960?*[3] There was no evidence that this had been caused by changes in fertility. So what was the reason? Here I turned first to the classic theories of Malthus, noting his famous theories centring round the preposition that 'population has this constant tendency to increase beyond the means of subsistence'. This tendency was due to the natural high fertility of human beings which, unless curbed by the positive (misery - this is war, famine, disease) or preventive (moral restraint of 'vice') checks would lead to a doubling of populations every generation or so. I summarized his propositions thus:

*'A. Population growth **sometimes** leads to agricultural growth.*
*B. Resources growth **always** leads to population growth (though he later qualified this).*
C. Population will always grow, unless curbed by moral restraint, vice or misery.
D. Population grows geometrically (exponentially), resources grow arithmetically.'[4]
*I proceeded to give some criticism of these propositions including the powerful counter-attack by Ester Boserup, who tried turn Malthus on his head by arguing that population growth was a **cause**, rather than the consequence, of economic development.*

Again I summarized her theory as a set of propositions.

'Proposition A. People prefer leisure to all other goods.
Proposition B. The intensification of production, for example the move from hunting and gathering to

[2] Insert reference to article.
[3] p.292
[4] Resources, p.296

swidden cultivation and then from swidden to settled multi-cropping, always brings more work for less rewards.
Proposition C. The only force strong enough to force people to intensify production is increase population.
Proposition D. Since population growth can no longer be explained by growth in resources (since the chain works the other way) some other cause of such growth must be suggested, apart from improved living standards. The suggestion is that this is a purely technical improvement in health due to medical and sanitary developments.
Proposition E. Given the above propositions, population growth is not an evil, indeed it is necessary. For example, it is true to assert, as Boserup does, that 'primitive communities with sustained population growth have a better chance to get into a process of genuine economic development than primitive communities with stagnant or declining population'.
Proposition F. Population growth is not only a ***necessary*** *cause of economic development, it is also implicit that it is a* ***sufficient*** *cause. It will, except in exceptional circumstances, trigger off such development.*[5]

Again I criticized most of her propositions, particularly the idea that people would **necessarily** invent their way out of population pressures. In particular, I commented in relation to Proposition D. as follows. *'Proposition D states that since population growth is not the result of growth in resources, some other external cause must be found and that this is medical improvement in the widest sense. Thus the emphasis is on a decline in mortality rather than, as Malthus argued, a rise in fertility. Although this is not a subject of central importance to Boserup for, as she says, "our inquiry is concerned with the effects of population changes on agriculture and not with the causes of these population changes", yet it is rather essential that some alternative to agricultural growth as the cause of population growth be offered. Thus Colin Clark saw England's population growth during the late eighteenth century as due to the elimination of smallpox and discoveries such as anaesthetics. Boserup also assumes that, "medical invention and some others factors", other than food production, explain population growth. Clark realized that finding such an explanation "may seen to some trivial or irrelevant. But it is not. Here we find the underlying cause, for better or worse, of the increase in the rate of world population growth which has been going on...since the middle of the eighteenth century." Recent studies of demographic history suggest that Clark's interpretation is over-simple and mostly incorrect. Medical improvement and a decline in the death rate do not seem to have been the causes of population growth. A detailed comparison of two English communities based on the technique of family reconstitution has shown that it was a lowering in the age at marriage and hence a rise in fertility, as Malthus argued, that caused population growth, rather than a decline in mortality. More generally, as we have noted, the data from Nepal and other parts of the world shows that rapid increases in population have often occurred long before medical improvements can have been effective. Thus Proposition F is also incorrect.*[6]

I was thus returning to the problem of the reasons for the decline of mortality before medical technology has an effect, but now in a much wider context, including my experience in witnessing such a situation in Nepal.

I then tried to investigate the relation of population and resources with reference to the major over-arching theory of the time, namely demographic transition theory. I summarized this as follows:-

[5]Resources, p.299
[6]Resources, p.301

FIGURE 1.

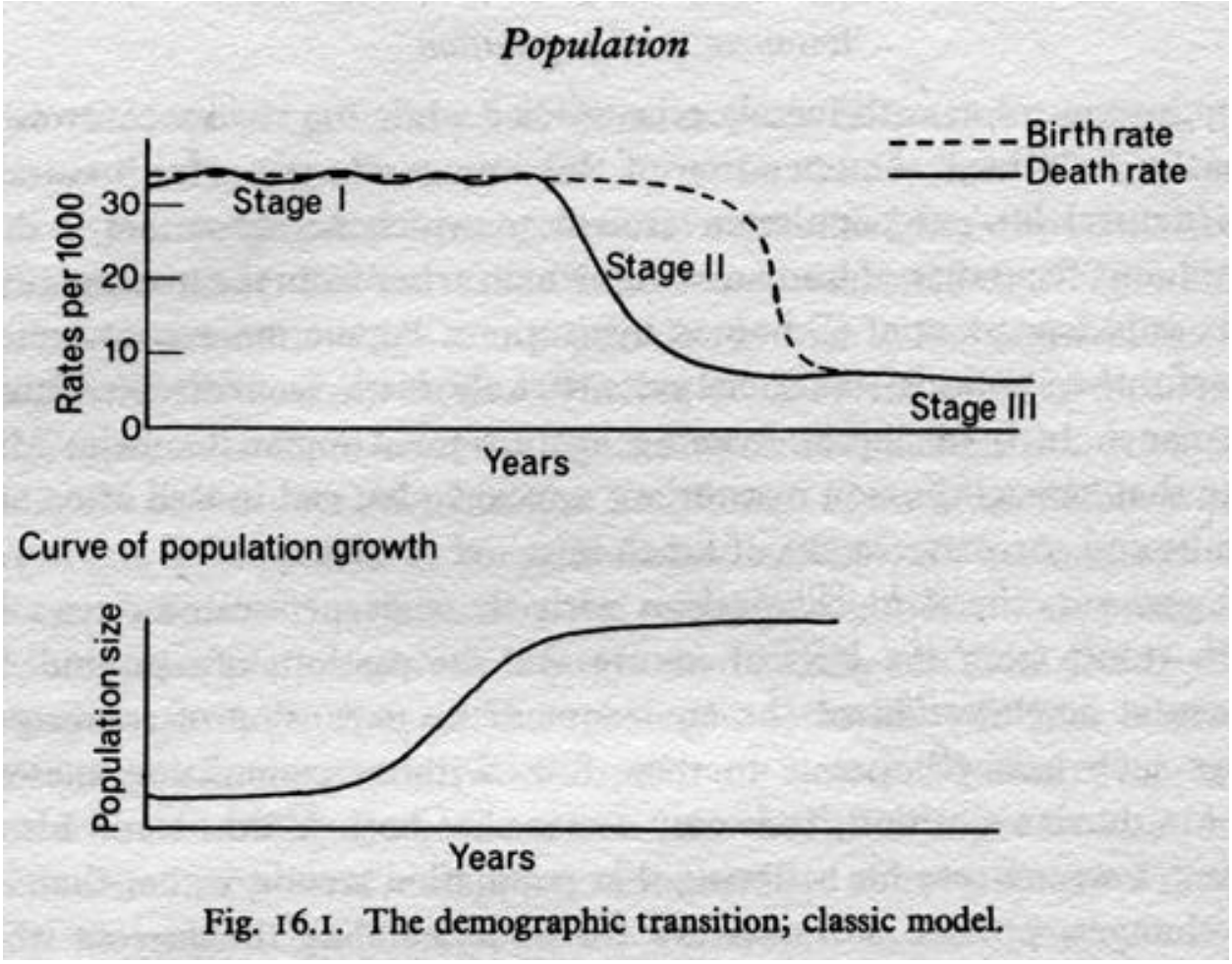

Fig. 16.1. The demographic transition; classic model.

I commented on this figure. *'Transition theory assumes that premodern populations maintain stability of numbers by balancing high, though fluctuating, death rates with high birth rates. As they begin to experience the effects of modernization, improvements in nutritional and health standards reduce mortality while fertility remains high and rapid growth ensues. Later, urbanization and other social changes associated with the more "mature" stages of industrialism create pressures favoring smaller families, and the birth rate falls, once again approaching balance.'*[7] Among the criticisms of this theory, I again returned to the evidence for England and Europe. *'It appears that fertility in Europe was much lower than in Asia and Africa...Nor, as we have seen, is it clear that it was a drop in mortality that caused population growth in the late eighteenth century; a rise in fertility may have been just as important.'*

I then looked at the picture of mortality rate in the supposed 'Stage 1'. I quoted Warren Thompson's view that 'Man has had a high death rate until rather recently because of what Malthus called the positive checks to population growth - disease, famine, and war.'[8] I then commented that this *'suggests*

[7]Resources, p.304

[8]Thompson, Population and Progress, p.16

that the main control on population has been perennial malnutrition and everyday disease.[9] My own experience in Nepal, as well as the observations of anthropologists, who were at this time just beginning to attack the stereotype of primitive 'misery', most famously in Sahlins' famous article on 'The Original Affluent Society',[10] made me question this stereotype.

I wrote therefore *that 'A close look at both data and logic suggests many flaws in this hypothesis. While it may be true that* ***on the average*** *human population has grown at an extremely low rate over long periods, this may conceal an entirely different short-term pattern than that implied above. This pattern has been well outlined by Kunstadter as follows. "A more nearly accurate model of demographic conditions in the small hunting and gathering or agricultural communities within which most non-modern men have lived may have been high fertility (beyond the level needed for replacement in normal years) with low-to-medium death rate, with occasional or periodic variations in death rates due to natural disasters (floods, earthquakes, climatic fluctuations disrupting the normal environmental relations, insect plagues, crop failure...etc.) and probably more recently, epidemic diseases. Chronic food-shortages must also have been a limited factor on population growth."*[11]

I then wrote *that 'This alternative pattern, which we may term a "crisis" model in accordance with its description by French historical demographers, may be understood more easily by way of 16.2 which contrast it with the original model implicit in the demographic transition hypothesis.'*[12]

FIGURE 2

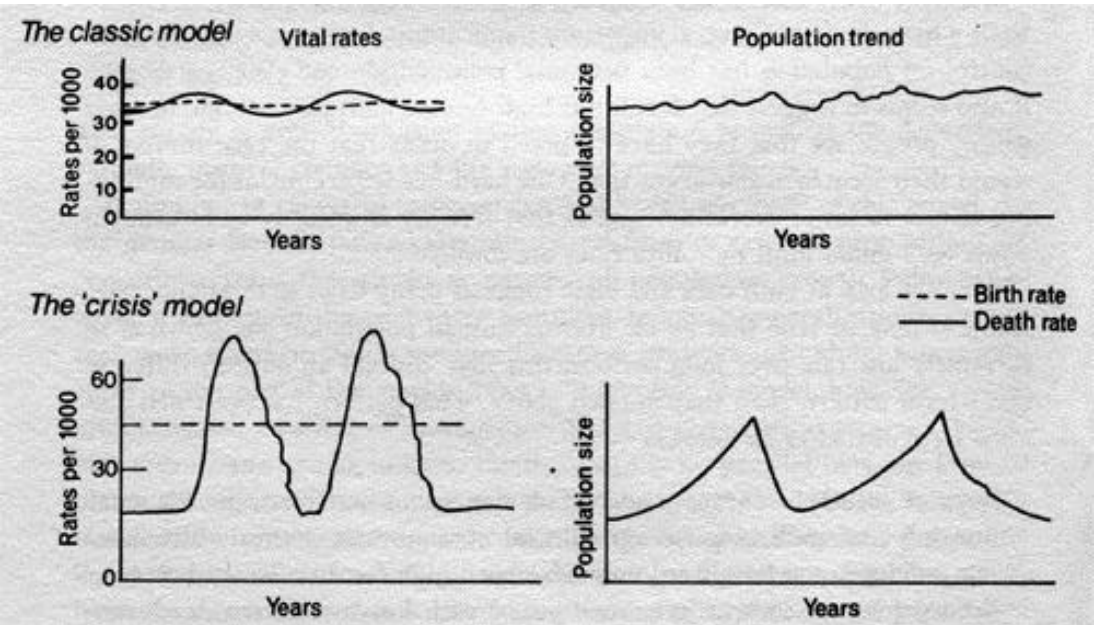

Fig. 16.2. Two models of pre-transition populations.

[9]Resources, p.305
[10]Sahlins, XXX
[11]In Harrison and Boyce, Structure of Populations, p.315
[12]Resources, p.306

I cited figures which showed that *'In normal years there is a fairly rapid growth, which is cut back periodically by massive disasters of various kinds.'*

The establishing of this 'crisis' model was extremely important in solving the problem of why Nepal's population has been rising so rapidly for almost a hundred years, well before any obvious *improvements in medicine, public health, or standards of living. I pointed out that 'The important consequence of establishing this alternative traditional pattern is that it throws open again the whole question of why population growth has recently been occurring in many parts of the world. It is no longer satisfactory to explain it in terms of lowering of everyday very high mortality as a result of medical improvements or an improved standard of living. It is more profitable to look at the elimination of periodic crises. This is especially important for the study of Nepalese demographic history since it appears likely that, like most societies, those in Nepal fitted the "crisis" pattern. To explain the growth of population from at least 1850, therefore,we need to look to the elimination of crises."*[13]

The major crises were war, and the consequent famines and epidemics which it brought in its train. The elimination of war, therefore, alone, could help to explain much of what had happened in many parts of the third world. The 'crisis' model, if correct, helps to explain the previous puzzle of why population growth in many parts of the world seems to have started well before any medical advances of rise in the standard of living. For example, the population of Nepal, Java, Ceylon, Northern Thailand, and elsewhere seems to have been growing from at least the early nineteenth century. This could not be explained by the earlier model. If, however, there had been a 'crisis' pattern, all that would be needed would be more effective peace-keeping, by an external force such as the British in India, to prevent periodic wars.'

A second form of control was of famine. I pointed out that an improvement in communications and agriculture may have lessened the dangers of famine, a process which had been observed in helping to eliminate the crisis pattern in eighteenth-century France, though I did not think it was as important in the Third World.

In relation to the third cause of crises, epidemic disease, I wrote as follows. *'As a correlate of warfare, epidemics have taken a huge toll. It is worth reminding ourselves, as a recent author has pointed out, that although pestilence and malnutrition are often assumed to have 'always been a feature of human existence until...the advances of medicine in the past half century'. 'In fact, for well over 90 per cent of man's time on earth, before the Neolithic development, neither pestilence nor malnutrition is likely to have been a common cause of ill-health of death."*[14] *The major virus (and bacterial) diseases of today, cholera, dysentery, plague, tuberculosis, typhoid, are all dependent on high human densities and can therefore have been prevalent only in fairly recent times. Like warfare, they appear to have been a phase through which world societies passed when a certain density occurred. Like warfare and localized famine, however, they appear to have been temporarily eliminated on a large scale. The influenza epidemic in India in 1918-19 was the last great mortality..."*[15]

This 'crisis' model, I thought, *'helps to explain much of the data we have, for though there clearly have been some societies with the classic features of perennial high mortality and high fertility, probably a greater number have followed the 'crisis' pattern.'*

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[13]Resources, p.306-7

[14]Boyden in Harrison and Boyce (eds), Population, p.415

[15]Resources, p.308

Yet I was not content with just these two models. My contacts with English demography, and particularly the work of Tony Wrigley, made me realize that a third model 'needs to be developed' *where 'there is a homeostatic adjustment between births and deaths which keeps fertility below its maximum. Here the check is not mortality, but social controls on fertility. We shall call this third model the 'homeostatic' pattern.'*[16] The nature of this model was shown in a figure as follows.

FIGURE 3.

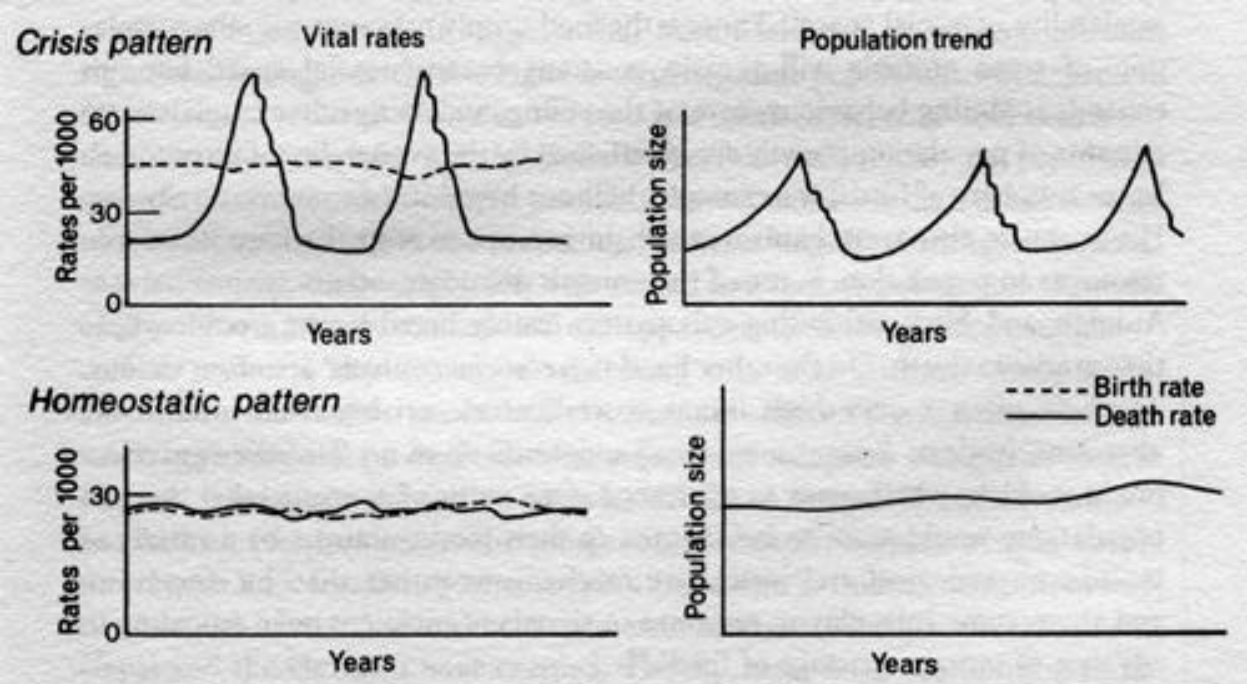

Fig. 16.3. Two models of population patterns.

I noted that the pattern had been *'observed in England between the fifteenth and eighteenth centuries, in France during the later eighteenth century and in Norway at the same time. In the latter two countries it developed out of an earlier 'crisis' pattern.' By implication, England had had a homeostatic pattern for much longer. I furthermore noted that 'Perhaps the best example of the homeostatic pattern in action is in England during the period 1650-1730 when population was kept level, not by very high mortality rates, but by keeping fertility below its maximum. Here England was strongly contrasted with France with its 'crisis' pattern. In England it was marriage patterns, and possibly, the use of contraception which kept population level with resources. In England this pattern even allowed resources to increase while population was static.'*[17] In a footnote I noted that *'The various patterns are well described in Wrigley, **Population and History**, especially ch.3.'*[18] I also drew attention to similar homeostatic devices which seemed to have been observed by Wynne-Edwards in relation to bird populations.

I felt that *'the homeostatic model is a useful one. It helps us to understand certain population*

[16]Resources, p.309
[17]Resources, p.310
[18]Resources, p.310 note 63

patterns, for instance that of England, and it is possible that there are a number of societies, particularly, perhaps,those inhabiting confined areas such as islands, which have kept their fertility well below maximum in this way. Where this homeostatic pattern is present the explanation of sudden population growth is more likely to be a decline in the controls over fertility than in the elimination of perennial or crisis mortality. It is perhaps not a coincidence that Malthus, living in one of the first large-scale civilizations known to exhibit this pattern, should have concentrated on fertility changes as the major determinant of population growth.[19]

On the other hand, the model which seemed to fit the Nepalese case best was the 'crisis' model. It looked as if population expanded because the 'crises', and particularly war, had been eliminated. The consequence of accepting their model was that unless the Nepalese changed their fertility regime rapidly, there would be demographic and ecological disaster.

It can be seen that I had made some theoretical progress. I had distinguished between what Wrigley was to call 'high-pressure' regimes, where mortality and fertility were perennially high, and 'low-pressure' regimes, where both were below maximum. All the time I was trying to combine my increasing knowledge of English demography, and in particular the impact of Tony Wrigley's work and that of the Cambridge Group, with the growing interest in Third World populations and in particular my experience of and work in Nepal and the Gurungs.

It is worth noting that my ideas in the final chapter of my book were developed after I returned to Cambridge as a Senior Research Fellow in history at King's in 1971. In my Ph.D. thesis, mainly written in Yorkshire and submitted in 1972, there is no trace of any of the above argument. The concluding chapter merely summarizes the thesis and ends with a grave warning about impending doom. It was therefore in the period around 1974-5, when I was preparing my book for publication, that I added this discussion.

What I had done was to take the puzzle two steps further. Firstly I had learnt that in England low fertility was as important as low mortality. Secondly I had learnt, though I was not fully conscious of this, that there was something unusual about English mortality. Unlike other countries, even in Europe, it did not seem to be mainly determined by 'crisis', but rather by steady endemic disease. This **absence** only really came out when one moved outside Europe, though in his work comparing England and France Wrigley had noted a similar fact.

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In 1974, the year before I officially joined the Anthropology Department in Cambridge,I gave two courses of lectures on population, comprising six lectures. It was at this time that I tried to come to grips properly with wider theories, for instance those of Malthus, Boserup, Wynne Edwards and others, and it was then that I probably synthesized the two streams of data -my English historical demographic work and the Nepalese case into a wider framework - part of which was re-written for the conclusion to my book, published in 1976. In a lecture in April 1974, for instance, which I have in front of me, in trying to explain rapid population growth at a world level I wrote that: *'In Malthus' time the problem was mainly to explain fluctuations in the fertility rate: with the late nineteenth-century revolution in sanitation and the twentieth-century revolution in epidemic prevention and malaria eradication and development of anti-biotics, the real determinant of rapid population growth is:-*

a) improved transport and surpluses which prevent famines
b) the localization of war

[19]Resources, p.311

c) the drastic lowering of mortality rates (presumably by medicine and public health - A.M.)

I illustrated the change in relation to Jamaica and then continued *'One might well argue that there is a **natural** propensity for population to increase quite rapidly - this has been so in most societies. What has, in fact, kept it back, have been crises from time to time.'* I then showed graphs of Chinese and Egyptian demographic history, taken from Hollingsworth,to show the crisis pattern. I ended this section. *'Malthus "preventative checks" have temporarily been withdrawn - this is the significant factor.'*[20]

In the autumn the two lectures had expanded to four and in September 1974 I revised them. Whether this is the time I wrote this for the first time, it is certainly the case that the first lecture on 'General Models and Data' outlines a good deal of what went into the final chapter of **Resources**. in particular the long critique of Malthus and Boserup, including the format of Proposition A, Proposition B. etc. including the long critique of Boserup's Proposition D that I have quoted above.

The second lecture was on 'The Demographic Transition: A Multi-Disciplinary Approach'. This again contains much of the work that appears in the conclusion to **Resources**, including the long quotation from Kunstadter etc. and even the diagrams of the 'classic' theory and the 'crisis' pattern. The wording is usually word for word similar to that in **Resources**. I drew attention to the similarity of the 'crisis' pattern to the work of Helleiner. I then outlined the 'Homeostatic adjustment' in much the same way as in **Resources**. A slight difference, not included in the book, was that I wrote, more daringly, when noting that eighteenth-century France and Norway changed to this homeostatic pattern, *'The difference about England is that the change occurred in the fourteenth century after the Black Death and consequently the new pattern can be seen in action for several centuries before the advent of industrialization.'* I also wrote that the major features of the pattern were:-

'1. Slow or static population growth from year to year.
2. Moderate mortality rates from year to year, with very few high peaks.
3. Moderate fertility, well below the maximum fertility to be expected given the age and sex structure.'

In the figure comparing the two patterns I included Wrigley's graph of English population history.[21] I furthermore described the situation in Colyton, as described by Wrigley, **Population**, pp.82-3. I then proceeded, as in **Resources**, to draw on crucial studies to support the argument. I concluded by drawing attention to the **three** models: the perennial and balanced high fertility/mortality; the crisis pattern; medium mortality and medium fertility - the later caused by social and cultural factors which have little to do with physical resources; little growth and few crises! If population grew rapidly, one wants have to decide which type of case one was dealing with.

The explanation would be, depending on the case, by
'(1) decline in yearly mortality because of medical improvements
(2) decline in periodic crises, principally by elimination of war, but also by elimination of famines and epidemics
(3) rise in fertility with the disappearance of the cultural factors which had previously kept it lower than maximum, plus a possible partial fall in mortality.'

*

This was the point I seem to have reached as I took up my lectureship in social anthropology in

[20] I should have said positive checks, not preventative.
[21] Wrigley, Population and History, p.78

January 1975. In that year, I believe, I was asked to give a guest lecture, at short notice, to a large Cambridge audience in a seminar series, in the Hopkinson Room (SPS Lecture Room). I gave a paper entitled 'Population Control in Pre-Transition Population', which I also used as the first of three lectures to the new Medical Sciences Tripos option in 1976-7. I pointed out that the problem was the very **slow** growth of human populations over long periods, given natural fertility. I outlined the perennially high mortality/fertility model and the flaws in this model, particularly drawing on Sahlin's work and that of others who had looked at hunter-gatherer populations. Likewise I cited the Gurungs, with their lower mortality levels and late sixteenth-century England. I then outlined the 'crisis' model and showed again that this worked in some cases. I then outlined the 'controlled homeostasis' case and gave examples of the pattern, including small hunter-gatherer groups, seventeenth-century England and certain bird populations.

At the end I wondered what affected fertility and why it was kept low. I remarked *that 'many of the "factors affecting fertility" are not **intentional**: this is one of the most difficult areas since it might be taken that since fertility control appears to be a conscious decision taken with a population-restricting view in mind. With animals, as with man, it may be an accidental **effect** especially patterns of marriage, infanticide in Hunter-Gatherer (other than Eskimos).'*

I asked myself the 'Reasons for breakdown?' - presumably of this homeostatic pattern. I wrote:
'a. H-Gatherers - loss of garden of Eden? various theories re climate etc.'
More to the point, in relation to 'B. England in the eighteenth century' I thought the causes must be.
'a. drop in age at marriage and rising fertility.
b. changes in virulence of certain diseases.
c. smallpox inoculation and milk'. The last of these probably refers to a theory then circulating and developed by Beaver, that changes in the milk supply in the late eighteenth century and nineteenth century had dramatically improved health.' Thus at that time I was aware that a two-pronged attack was needed. There were two puzzles, rising fertility and decreasing mortality, and both needed explanation. What I did not know was that the theories I put forward for declining mortality were all very weak - that there was no real evidence for a change in the virulence of certain diseases, or any dramatic effects of smallpox inoculations or improved milk supplies.

All this work on demography was closely linked to my main work, for which I had held my research fellowship at King's, namely the study of sexual and marital patterns in early modern England. This took on an added interest as I began to realize that at least half of the answer to the demographic puzzle of early modern English population lay in a peculiar fertility pattern, which in turn had to be set within the context of the family, marriage and sexual behaviour. My interest in demography led me to do a good deal of teaching in that field, for many years running a special anthropology and demography paper in the Tripos, for instance, where I taught alongside Geoffrey Hawthorn, who influenced me very considerably (including through his lectures which I attended several times). Likewise, my known interest in the family and marriage led me to be asked to take over the 8 introductory lectures (previously given by Meyer Fortes and then Esther Goody) on kinship and marriage. The need to explain simply to large audiences of new students this most difficult and technical of anthropological topics was very daunting and I well remember my panic. On the other hand, as I hope the shortened film which I recorded towards the end shows, it led me to gain an overview of an area which re-shaped my understanding of the history of English kinship and marriage. The brunt of this learning took place in 1974-1976 when I was really learning social anthropology in the best way - by teaching it. It was a tremendous effort, especially as it coincided with personal difficulties when we were living at Inland Close. The next stage took place when we moved from a rented house in Grantchester to our own first home in the village of Lode in September 1976.