Trends in Western Civilization Program,
No. 6

SOME LONGITUDINAL TENDENCIES II

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1. INTRODUCTION. The assembling and interpretation of scattered evidence.

There are three problems on which we want to focuse interest in this introduction: (1) How the study of longitudinal tendencies is related to the program it is a part of. (2) The methodology in collecting data. (3) The interpretation of the evidence.

The "Trends in Western Civilization Program" has interest in "the West" as a unit for study. It is clear that people lived in and were influenced by other units than the national state. There were both smaller and larger units. In Europe they lived within a distinct western civilization.

Its economy, its population, its internal and external policy, its social structure, cultural character and habits might be studied - for this civilization as well as for a state. This is one of the starting-points of our study.

A further point is the long time-span. We regard western history in its entire length. The foundation laid thousands of years before our time is a part of the study. In a perspective like this one ends with the question: what did happen in western history? We do not think of the events. Rather our question is what transformations western society has - in the end - gone through. Certainly society has changed. And the change has had a direction - we are told. From "Stone Age" to "Machine Age", from barbarism to civilization. Usefull as they are - these concept do not contain the answer to our question - what happened in history? The Roman Empire was "crushed". But this is a picture from everyday-life. Certainly a development took place that was more subtle. Much of what we call "society" is embedded in the relation between men. In this field something must have taken place.

So there was a society. There was relation between men - between men and their needs - between men and resources: ability, materials, time. Behind ascending and descending empires, behind production and distribution of goods there are these factors.

So what happened? Societies changed their labels - but what in their character? Population increased. And the fact that more people drew their living from the same area is heavy with implications. Climate changed. And here we enter implications that are more complicated to work out. Did the changes recorded have any effect at all on a European scale? Did deterioration induce society to changes rather than simply knocking it down?

In this way trends occur in western civilization. There are trends in population, in climate, in production. So to answer our question what really happened we pick out a number of factors. Most of them can be determined numerically. Thereby we submit to limitations imposed on us by relying on numerical description.

By plotting trends - be they numerical or not - one can describe what happened in western history in terms of increase, decrease, cyclical variation, constancy or simply variation leading nowhere in particular. A broad scale of periodizations occurs. When one has proceeded so far - however - one has discovered that many aspects are connected to one and the same trend. The climate plays its major role through its influence on agricultural production. The rate of interest on capital expresses something of what is going on in economy. At the same time it is an indicator as well as a potent factor.

One is therefore led to the causes and effects that are connected with the trends. Some opinion about the entire society is needed. We need to have a conception about how it functioned - the society from which sprang Western Civilization - the context within which it existed. A numerical description not only of the trends but also of the society whose aspects we measure. To describe the functioning of the factors in society. There will be a tendency to seek to limit the number of causes operating. To pick out a number of "movers" is a part of the task. Perhaps one should not talk of causes but co-variation so far.

It might be that an impressionistic, intuitive conception would do. We do not possess one. To obtain it we will have to pass through numerical description. It is nothing new in describing a society like this. We will point to the books and articles by F.Braudel and A.H.M.Jones in the bibliography. Our research is more humble than theirs - but we can profit from their work.

So to an interpretation of the tables. Population rose - of course. A number of demographic factors determine rise or fall in population. These factors are mortality, marriage-age, propensity to marry, fertility, infant mortality and more. People seemed more able to manipulate these factors in order to control their number than we had expected.

Men apparently did not move towards its Malthusian limits without some sort of consideration. The increase in population contained an element of a voluntary action.

Health has definitely improved - at least it seems to be no doubt that young people have better prospects for a long life than in earlier periods. For the old the prospects may be more equal. The breakthrough has occured in the 1900s when one takes the world as a whole in consideration.

Education might have been more wide-spread than we imagined when we started. Book-prices were very high compared to those of to-day, but there might have existed a production of cheaper pamphlets. The fall in book-prices occured in the 1900s - the cheap book being a recent phenomena.

Working-hours increased during the Industrial Revolution. They were 12 hours - with break - in Antiquity. In the Middle Ages they were often shorter. The religion in former days imposed a limit to working-hour per year by the demand for religious services.

"Prices" - that is the relation between gold and goods - expressed as the amount of gold that is required to buy a certain amount of goods - changed. They were high when bullion entered Europe in the 1500s. They were high in Greek Antiquity. They are high in the Industrialized world today.

The social differentiation of Ancient society is well known. Though we found the various groups far more differentiated than we had expected. Manufacture played a considerable role in economic life - though as a part-tome occupation we believe. To cover needs for clothing more labour was certainly needed then compared to now. Clothing accordingly was "more expensive" then, less clothing was produced, the needs less covered. This can not be applied to many services. Certainly many services rely on technical progress of relatively late date, and certainly many of them are a part of the responsibility lately taken up by the public, but it would not be to unreasonable to believe that before the Industrial Revolution services were relatively cheaper than industrial products - compared to later - and therefore more bought. This might even apply to some sectors of production. There was not much food produced per head of population. So corn was expensive. Having this fact in mind there are astonishingly many bakers in some medieval towns.

One shall not forget other sectors than agriculture. One shall not forget the public sector in economy either. The state - or crown - is only a part of this sector in a time when more relied on local authorities. Even the state sector forms a unit in economy covering some percents of the total product. This is little compared with our standards but could well have effect on economy - especially with regard to the concentration upon armamant and court.

Some Longitudinal Tendencies II was intended as a basis for further work. Its scope has been altered on the way - what has not been without effect on composition of the paper. As an exercise in writing papers, as an experiment in collecting datas for our pupose is this paper to be understood.

2 DEMOGRAPHY

2.1 Introduction to demography.

Just as one might want to describe one individual one might want to describe a population. In the individual case one will wonder what a description should include: Colour of the eyes of course, but is length of nose an interesting feature? So in describing a population. So it is in any description. And descriptions is what this paper mainly is concerned with.

A description of a person can hardly be total. The information required to make a photo is enormous. And still it will make a rather static view of this particular person. So in demography. We have no chemical agent to take care of some of the task - as a photo - and when all are tabulated we miss the interplay between the factors.

When we aim at picturing the development of the demographical factors through the entire history much has to be cut out. The goal lies in the synthesis - the specialist in the field will always be able to invalidate a generalization by pointing to the deviation. But while one accept that there will always be new factors to take into consideration, there is a need for a starting-point from which to proceed.

An element in demography will be the Malthusian checks on population. A main feature in European history is the recurring periods when population has outrun the resources, or rather outrun its own ability to make use of the resources. The early 1300s, the late 1600s and the mid-1800s are prominent periods. The first two have pressed their imprint on demographic history. So has the third, but here technical break-through and emigration gave it an entirely different character.

An increase in population does not seem to stem from the human charcter. This chapter will point out how numerous were the mechanisms of control - sex ratio, late marriage, abortion, celibacy. There is strong evidence for family-planning. (David Gaunt 1974). Probably the small economic units in society - like the family - could reap benefits from children - it might have been from necessity or from attempted gain. Children were important in production. Many children could mean saving from starvation and even a degree of prosperity for the single individual and family.

But increase in population could also benefit society. Man is also producer. The"Times of Feast" might have contained element that postponed the "Times of Famine". And single nations could always prosper - by fortunate factors or on the expense of others. And finally emigration was a reality already in Antiquity. Not only the barbarians were on move.

There might be a possibility that urban areas, industrial and stock-raising districts responded more willingly to factors pushing up population than did corn-growing districts. As both the industrial and the urban sector counted a large population,they were certainly able to influence life. And manufacture often concentrated in the stock-raising and dairy-areas. (Hellenbenz 1973). Here the individual opportunities by increasing families could be evident - opportunities that brought the population to press on its resources and bring about new factors in economic life and in social life.

2.2 Expectation of life.

Expected life at birth can roughly be said to signify the average number of years a person will live. The concept is rooted in a precise statistical meaning.

We have tried to scetch the main trends in its development in table and figure 1.

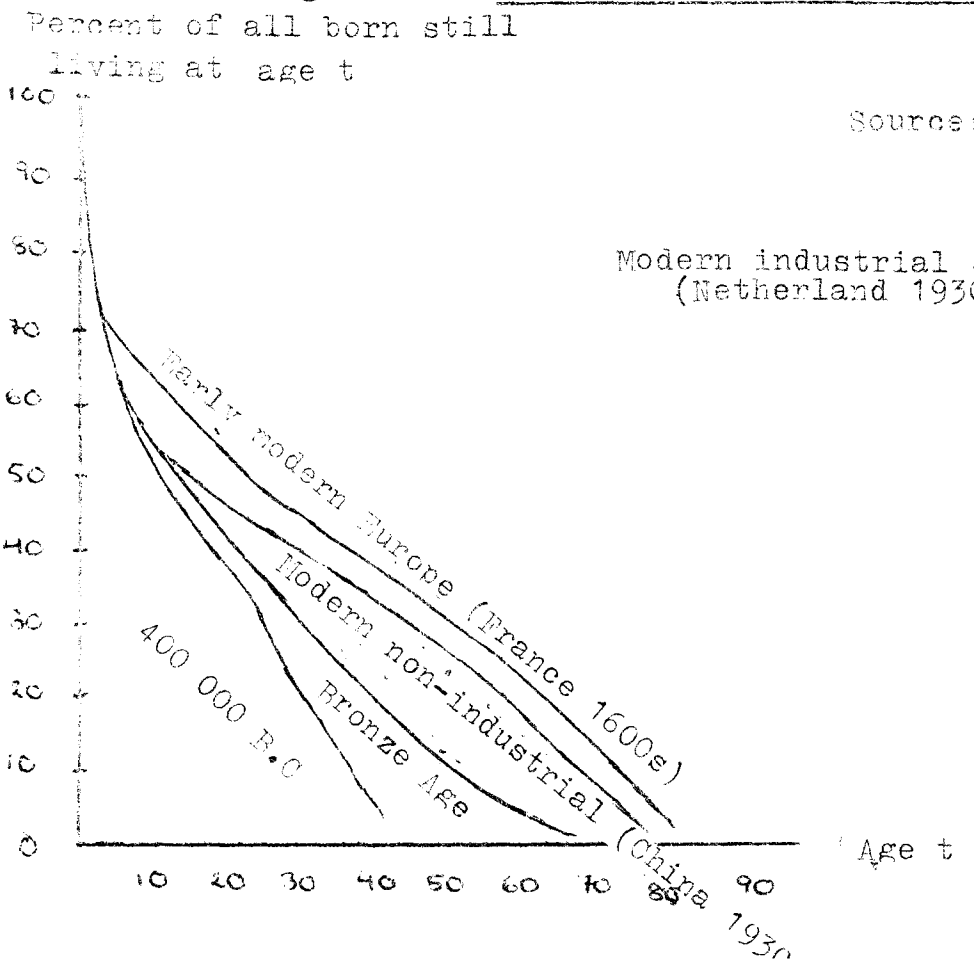
2.2 Expectation of life.

Table 1. Life-span in pre-history.

Period	Percentage of deaths occured at the age of:					Sample
	Under 14	14-20	21-40	41-60	Over 60	
Sinanthropus	68	14	14	4	0	22
Neanderthal	55	11	30	4	0	20
Palaeolithic	55	6	32	7	0	102
Mesolithic	55	4	38	2	1	65
Bronze Age						
Austria	50	9	22	15	4	273
Cyprus	50	11	19	20	0	38

Source: Clark 1968 p. 38.

Figure 1. Life-span from 400000B.C to the Present.



Source: Clark 1968 pp. 39,40.

Table 2 Expectation of life in the last 2000 years.

Period	Area	Expectation of life in years
Roman	Roman Empire	25
800	France	21
1200	"	23
1400	"	26
1500	"	30
1600	"	32
1700	"	33
1800	"	35
1900	France	42
1901-11	India (men)	22,6
1948	Egypt	31
1966-70	Norway (men)	71,1

Sources:		
	Roman Empire	Lopez 1971 p.1
	France 800 - 1800	Freund 1973 p.43
	India 1901-11	Yearbook 1972 p.363
	Egypt	Lopez 1971 p.1
	Norway 1966-70	Yearbook 1972 p.363

Table 3 Expectation of life. Male, female, age groups.

	Roman Italy		India 1901-11	
Age	Male	Female	Male	Female
0			22.6	23.3
10	17-18	15-16		
15			30.3	30.8
20	16-17	10-11		
30	15-16	11-12		
40	15-16	15-16		
50	10-11	10-11	14.0	14.3
60	10-11	8		
65			8.1	8.1

Source: Beloch 1886 p.51, Yearbook 1972 p.363

Table 4 Expectation of life. Men and women compared.

	Roman Spain		India 1910-11		Norway 1966-70
Age	Male	Female	Male	Female	Male
0	35.3	30.2	22.6	23.3	71.1
1	39.1	33.3			71.2
5	37.0	31.2			67.5
10	33.1	27.6			62.7
15	29.5	23.9	30.3	30.8	57.8
20	27.5	21.8			53.1
30	25.7	20.8			43.6
40	22.4	18.3			34.2
50	18.2	14.3	14.0	14.3	25.3
60	13.7	12.3			17.3
65	13.0	11.9	8.1	8.1	13.9
70	10.1	9.2			10.9
80	8.1	8.4			6.1
90	6.0	7.6			3.2

Sources: Russell 1958 p. 25, Yearbook 1972 pp. 26, 363.
Cases reported for Roman Spain: 885, 1111.

Table 5 Mortality rates 15-34. Men and women compared.

	Mortality rate pr. 100 in interval. Roman Spain.	
Age -interval	Male	Female
15 - 19	9.9	11.9
20 - 24	14.6	16.0
25 - 29	14.1	22.2
30 - 34	14.5	18.7

Source: Russell 1958 p. 25.

Table 6 Expectation of life in Antiquity.

Age	City of Rome Male	City of Rome Female	Greece, Illyricum, province of Asia Male and female
0	15.3	16.3	29.2
1	22.5	21.3	33.1
5	22.4	20.0	31.2
10	22.5	18.1	28.7
20	20.6	14.5	22.7
30	20.0	15.2	19.6
40	19.4	16.8	18.9
50	18.5	16.5	16.5
60	14.4	13.1	11.9
70	12.0	10.6	9.1
80	8.3	7.5	6.0
90	5.4	6.0	5.1

Source: Russell 1958 p. 26. Based on 4575, 3490, 2345 reported cases.

Comments to the tables 2 - 7:

Table 2 shows the long-term development in life-expectation at birth. Life-expectation at birth is given as the average number of years a new-born survives. It looks as if two conclusions might be drawn: (1) Living conditions in pre-modern Europe might have resembled those found in India and Egypt earlier in this century. (2) Increase in life-expectation has mainly taken place in our century.

As far as life-expectancy is any guide to demographical conditions in general this can indicate that studies of contemporary societies might have a certain relevance for ancient European societies as well. We shall see later in this chapter that the similarity holds for other demographical conditions also. After the Second World War life-expectancy has increased very rapidly in countries like Egypt and India and is approaching European level. While one must

Table 7 Expectation of life in medieval England.

Period / Age	Before 1276	1325-46	1346-75	1426-50	Norway 1966-70 Male
0	35.28	27.22	[illegible]	32.75	71.09
1	39.96	31.73	23.65	37.04	71.22
5	39.87	32.25	26.52	36.62	67.51
10	36.32	28.11	25.10	34.49	62.69
15	32.74	25.10	25.18	30.89	57.81
20	28.74	22.13	23.86	27.70	53.08
30	22.80	21.09	21.97	24.13	43.61
40	17.83	17.68	18.14	20.44	34.22
50	12.70	14.29	15.95	16.39	25.32
60	9.42	10.81	10.90	13.71	17.33
65	7.93	8.35	8.30	12.30	13.86
70	6.93	6.92	6.77	10.49	10.87
80	5.18	6.00	4.67	7.90	6.14
90	5.00	2.50	2.50	3.69	3.16

Source: Russell 1958 p.31, Yearbook 1972 p. 26

suspect that many indicators showing that conditions improved in the last centuries in reality refer to a limited area, improvement in life-span is a global improvement.

There is a third striking tendency. (3) There seems to have been a steady and slow rise in life-expectancy in Europe. As we shall see in many other cases - the modern leap occured after centuries of slow progress. Probably two factors are mainly responsible for this development - nutrition and health. While food-supply probably rose, due to productivity and new crops, population in certain periods tended to outrun production so that nutrition again became worse. The decades around 1300 and 1700 withnessed these "Malthusian checks" on population. There are no trace of these crises in this table but we shall find it later.

But health complicates the picture. There might have developed immunity towards diseases like plague, on retreat in Europe after 1600. There are cases of improvement in medicine, as against syphilis. At the same time new diseases

emerged.

Table 3 compare span of life in Roman Italy and Modern India. Life-expectancy for men and women are shown separately. Finally there is given expectation of life not only at birth but also at 8 ages later in life.

Much evidence has been collected since 1886. In one respect the figures are outdated, we now believe life-span in Roman Italy to have been some years longer (see table 6). Roman authors give some indication on span of life. The main part of the material however comes from tombstones.

But we can point to other conclusions: (1) Contrary to modern experience there are indication of shorter life-expectancy for women than for men in Antiquity. (2) Even if life-expectancy in the main corresponds for Antiquity and Modern India there are big differences in the young ages, particularly 10 - 20.

Table 4 compare India with recently collected material from the well documented province of Roman Spain. Norway is presented for comparison. The evidence is based on engravings on tombstones , for which probably only the well-to-do could afford to pay the stone-carver. We must expect the material to be biased towards the well-to-do. New-born hardly figure on tombstones. Their mortality are estimated by J.C. Russell. The material from medieval England seems to indicate that differences in life-span between various classes were perhaps not so great, royal persons had an average life-span of 31.7 years. We see that (1) there are a striking difference between men and women in expectation of life. (2) The shorter expectancy of women is most marked in the fertile ages, between 15 and 45. This must be interpreted that women have a particularly higher mortality in these particular ages. (3) Above the age of 50 women and men have almost equal expectation of life. (4) In the high ages - above 65 - there is a

remarkable little difference between ancient and modern conditions. If ancient men and women had succeeded in surviving to 60 they enjoyed almost the same prospects as people do to-day.

It is often argued that rise in life-expectancy is due to reduced mortality for children. We see there is reason to believe that reduced mortality for young people has also played its part. The same young ages produce a shorter average life-span for women. This difference wane in higher ages when mortality for both sexes approach what seems to be a fairly modern mortality-pattern.

If malnutrition was the main agent in producing a shorter life-span in Antiquity there might be some reason to believe that the oldest would suffer most and die earlier. That - on the contrary - young people show higher mortality, J.C. Russell taken as an indication that disease was the main agent that produced higher mortality than to-day.

Table 5 shows mortality rate for some age-groups for men and women in Antiquity. Mortality rate is given as number of deaths that will occur pr. 100 persons in the interval, not annual average. For comparison it might be mentioned that 0.5 - 0.9 persons died in the corresponding intervals in Norway 1970. (Table 8).

We see our expectations on a higher mortality for young people 15 - 35 years of age, and in particular young women confirmed.

Table 6 is also showing life expectancy in Antiquity for various age groups, men and women. If we compare with table 4 we see the great differences between Roman provinces as estimated from Russell's material. Spain is an area where high expectation of living is reported. The city of Rome has, besides Latium, the shortest expectation of life if the material is correct. Greece, Illyricum and Asia is an area in the eastern part of the Roman Empire.from which evidence is rich. Russell interprets the variation as due to differences in climate , that is humidity, and increased

disease, tuberculosis, was caused by this. Others have pointed to different social origin of tombstones.

A striking fact is that there is no difference as far as the higher ages are concerned. Above all there is the high death-rate among young people that is pushing the expected life for new-born as low as 15-16 years in the city of Rome. So not only the difference between Antiquity and the Modern times but also differences within Antiquity seem to originate in the high death-rate among youngsters.

Table 7 shows expectation of life in England in the Middle Ages. Norway 1966-70 is given for comparison. The evidence in table 7 is originally collected from wills. Probably the material is biased towards the well-to-do. So we might believe that these people at least did not starve to death. It could in this connection be pointed to the English royal family (Russell 1958 p. 29) - a sample of 85 persons who got enough - if not necessarily healthy - food. With around 30 years life-expectation royal persons did not enjoy a longer life than people at large.

The years of the early 1300s were difficult years, with a population repeatedly attacked by famine. The evidence from the period 1346 - 75 is influenced by the Black Death. But we find the traces of the calamities of the periods mainly in the young ages. From 30 and upwards there are small variations only. A slight rise in expectation of living throughout the period is discernible, especially in 1426 - 50. After the Black Death production fell less than population (see for instance table 30) making a bigger surplus available for consumption. Perhaps it also bettered health-conditions.

2.3 Mortality rates.

Mortality-rate is the number of persons out of 100 or 1000 that dies within a given year (or a given period).
In a population it vary according to age. It is therefore influenced by the age-composition of the population and also by wars and famines. It is no ideal parameter in describing population. As it is often estimated and easy to compute it is nevertheless necessary to have knowledge of its variation in history. By knowing its usual niveau it becomes easier to relate new material and place it in its proper setting.
Figure 8 and the raising expectation of living give an impression of falling mortality-rates through the ages:

Table 8 Mortality rates in age-intervals.

Age interval	Roman Egypt	Roman South Italy	Norway 1970 Male
1-4	(7.5)	(9.5)	1.9 (0-4)
5-9	7.0	9.8	0.3
10-14	8.3	9.1	0.2
15-19	10.3	15.2	0.5
20-24	18.6	17.1	0.6
25-29	18.5	19.2	0.5
30-34	13.1	17.3	0.7
40-44	17.5	24.9	1.5
50-54	22.1	26.5	3.9
60-64	26.1	34.7	9.9
[illegible]-74	29.3	40.0	26.1

Sources: Russell 1958 pp. 27, 29. Yearbook 1972 p. 25. Cases reported 813, 1913.

In 1871 - 75 Norway had mortality-rates at 22.5 (0-4), 3.7 (5-9), 4.7 (20-24), 15.0 (60-64) and 33.2 (70-74). Even if the first year of living is not included in the Roman figures, they are still low. And tombstone-evidence takes bad care of young children. Only over 70 is the mortality today resembling that of Antiquity. Our

expectations from the chapter on expectancy of living are largely confirmed. There is considerable improvement from Roman mortality to that of the 1800s. In the age-group 20-24 mortality has dropped from 18.6 to 4.7. It again confirms high mortality of youth in Antiquity. It might be added that Egypt was one of the Roman provinces with the lowest registrated mortality.

Table 8 compares mortality-rates in various age-groups from Antiquity and the Present. Mortality-rates are closely related to expectation of living, and we can draw much the same conclusions. So we need not say more about this subject here. A handier measure than mortality-rates given separate for age-groups is one that gives deaths in percentage of population. It is easy to make a comparison with birth-rate to determine a factor as important as the growth of population. On the other hand it is a measure that is influenced by the age-composition of the population.

Table 9 presents the crude mortality-rates from Antiquity to the Early Modern period. We are interested in the longitudinal development of mortality-rates, its territorial variations, its variation from urban to rural environment and between social classes.

(1) There is at best a slight fall in mortality from Antiquity to the Early Modern period. Ancient and medieval mortality was close to that of modern areas with particularly high mortality. The fall in mortality seems to have taken place recently in history. (2) The Italian towns presented are not pure urban cases - but contain a strong urban element among their population. In these cases the towns compare favourably with the countryside. It might be that the normal pattern was a population that reproduced itself in normal years while especially the towns declined during famine or plague. (3) The best starting-point for comparing social classes is the sex-ratio. Here we might only point to the high rate of mortality for the royal family compared to the wealthier part of population that has provided us with the material from medieval

Table 9 Mortality rates. Deaths per 100 of population. Antiquity to Early Modern Period.

Area	Period	Mortality rate per 100	Comment
Rome	Roman	6.5	Male
Rome		6.1	Female
Latium		6.9	
Northern Italy		4.8	
Southern France		4.3	
Egypt		3.5	
Spain		3.3	Male
Spain		2.8	Female
Germany	10-1300	3.6	
Germany	13-1500	4.1	
England	Medieval	3.3	Royal family
	to 1276	2.8	
	1276-1300	3.2	
	1301- 25	3.4	
	1326- 48	3.7	
	1348- 75	5.8	
	1376-1400	4.9	
	1426- 50	3.0	
Mantua	1496-1510	3.0	
Venice	1560- 97	3.1	3 years
Palermo	1600- 19	3.2	Whole period
Modena	1600- 19	2.6	6 years
Genoa	1600- 19	3.6	1 year

Source: Russell 1958 p. 34.(Germany : - after W.Abel.)

England. Neither do the Italian towns - a more "average" population - show higher mortality-rates than the royal family.

The Black Death is marked in the table. With a birth-rate probably near 4.0 some of the societie s presented could hardly keep up population without immigration.

2.4 Infant mortality.

Certainly infant mortality has dropped in industrialized countries. Is this a recent tendency, on what niveau was the infant mortality earlier in history? How were the variations between classes and between urban and rural born?

Table 10 Infant mortality per 100 born. England 1500s.

Age	Nobility 1500-99	2 British cities	
0	19.3	11.7	17.8
1-4	7.7	6.5	-
5-9	3.7	5.9	-

Source: Russell 1958 p. 35.

Table 11 Infant mortality per 100.

Period	Area	Mortality per 100.
1300	Germany	50.0
1680	"	33.0
1816-40	Rural Sweden	16.3
1816-40	Stockholm	30.7
1840	Ireland	8.1
1870	Germany	25.0
1913	"	14.0
1925	"	10.0
1948	N.W.Nigeria	29.4
1955	Germany	4.4

Sources: Freund 1973 p. 225 (Germany), C.Clark 1968 p. 43.

In itself, the widespread practice of killing babies might push the infant mortality high up. This does not enter into the figures. We have however, registrated cases where the number of men are twice that of women - indicating that at least 25 % where killed after birth. At least this is the best explanation for the general surplus of males.

Table 10 shows infant mortality at various ages. A high modern infant mortality in the first year of living would be c. 30.0.per 100 born. We can compare with table 8 p. 15, but the infant mortality in Antiquity is due to estimate. Russell puts the mortality in the first year of living to twice that of 1-4. If we can put trust in our figures neither Roman nor Early Modern infant mortality compared infavourably with a modern population with high infant mortality. We have separate data for nobility and two cities, one of them is Exeter. It is strange that the nobility should show such high mortality. Perhaps registration of child-birth was still deficient in the 1500s.

Table 11 compares infant mortalities in the first year of living. North-western Nigeria is presented as one of the highest rates registrated. Both in Germany and in Sweden the same niveau is found in earlier periods. (1) The difference between Stockholm and rural Sweden confirms what would be expected. (2) There are big differences between the rates from different countries. If this can be trusted it might also be difficult to picture any trend through history.

2.5 Marriage

Marriage is interesting for two reasons. It is usually a precondition to childbirth. Not all couples lived in wedlock and many children were born outside marriage. For some groups - the clergy - this was a necessity in most of Europe. We would nevertheless assume some link between the phenomenom of marriage and that of childbirth. Usually a

Table 12 Percentage of population living in wedlock.

Period	Area	Percentage	Comment
Roman	Roman	39-44	Estimate. Maximum.
650	Italy	c.33	Villages. 120 cases.
820	Paris area	43.9	Villages, 4280 cases.
800s	Reims area	33.4	Villages, 711 cases.
800s	Marseille area	31.9	Serf-population.
800s	Germany	28.6	Villages, 2282 cases.
1377	England	38-50	Whole country.
1400s	Basel	32.8	
1400s	Freiburg	38.7	
1400s	Ypres	34.6	
1400s	Dresden	49.3	
1427	Tyrol	40.9	Villages, 3689 cases.

Sources: Russell 1958 pp. 13 - 18. I get 40.9 for Tyrol, from 1510 married out of 3689.

Table 13 Percentage married of adults.

Period	Area	Percentage	Comment
800s	Paris area	79.0	Settlements
800s	Germany	57.4	
1377	England	81.6 (men), 86.1 (women)	
1377	Colchester	62.2 (men), 59.3 (women)	
1427	Tyrol	93.1	

Source: Computed from Russell 1958 pp. 13-18.

Unmarried were:

Paris 800s	388 men,	114 women
Germany 800s	250 men,	159 women
Tyrol 1427	89 men,	12 women

For England 1377 the first pair of percentages refer to settlements with less than 25 inhabitants. Colchester had approximately 4000.

Table 14 Age at marriage.

Period	Area	Age at marriage		Comment
		Male	Female	
Roman	Roman	26	18	
1270-1327	England		20-24	Wealthier
1327- 77	"		c.20	Wealthier
1483-1509	"		15-19	Wealthier
late 1500s	"	27.6	24.5	Village
1500- 99	Europe		20.1	Nobility

Source: Russell 1958 p. 19.

Table 15 Distribution of marriages by age.

Age	Roman men	Roman women	Europe 1500-99
10-14		39.2	8.2
15-19	20.6	35.1	45.9
20-24	29.9	15.2	28.1
25-29	18.6	4.1	11.8
30-34	13.4	4.7	3.6
35-39	7.2	1.2	1.2
40-44	4.1		1.2
45-49	2.1		
Over 49	4.1	0.6	

Source: Russell 1958 p. 19

large number of married women will mean a large number of children born. Besides marriage is interesting in itself as being a most decisive event in life. People must often have changed home, sometimes family, always economic conditions.

Marriage must have taken place under the prospect of the high death-rate prevailing. It is commomly held that a person surviving to - say - 80 years would have lived through 3 marriages. This might also be deducted from our

Table 16 Percentage of women in marriage.

Age	England 1270-1327	England 1327-77	England 1483-1509
10-14	5.7	17.2	18.2
15-19	35.4	38.0	68.9
20-24	50.8	75.0	79.4
25-29	85.1	73.9	96.2
30-34	76.5	73.9	81.3
35-39	71.4	58.5	94.3

Source: Russell 1958 p. 19.

tables. A healthy lady from imperial Rome (table 6 p.10), marrying at 10, would have to marry again at 30 if her husband married her in his 20-s and died according to statistical average. If she now married a man 30 years old she might have to re-marry at 50. Before she was 70 it was time once more. There was generally a male surplus in Ancient and medieval population. Contrary to what might be expected this did not constitute any major obstacle to marriage. J.C. Russell clarifies how the high mortality made population able to cope with this problem. The male surplus was present already below the age of marriage. So it was impossible for men to marry women of thir own age. If they - on the contrary - in average waited for women 5 or 10 years younger, their generation would be so reduced by mortality during the period of waiting that the number of elder men and younger women matched each other. This model seems to be traceable in demographic material. Male surplus and higher age of marriage for men are predominant.

As for the lasting of marriage - mortality-statistics might provide a key. First marriage probably took place at an age where expected life was about 20 years. More than half of the marriages would then have been broken up after 20 years - by the death of one of the partners or both. Perhaps half the marriages would have terminated after approximately 15 years with an average duration of marriages somewhat longer. Subsequent marriages can

be regarded to have an expected lasting in similar relation to expected living. It is not so difficult to determine when half of the marriages will be broken, that is when 2/3 - 3/4 of expected living has lapsed.

A marriage can be broken by other means than death. Divorce was an occuring practice.

It has also to be taken into consideration that not all couples were living in wedlock. In many periods this has been a necessity to the clergy in most of Europe.

To how large extent did widows and widowers re-marry? In an earlier paper in this serie we presented views on this based on an article written by the demographer Hajnal. It presented a shift in European demography taking place in the 1500s and 1600s. From a state marked by early marriage, few un-married and few that never married Europe turned to late marriage, more unmarried - as widows and widowers - and more that never married at all. Our material at present is not conclusive, but we believe that remarriage took place if the partner fell away while the other was not too old.

After these introductory remarks we may consider our tables and the two problems we will try to answer in connection with marriage: (1) What percentage of the population lived in wedlock, (2) At what age did they marry? As for (1) we know little about Antiquity - only an estimated maximum for comparison with the other datas.

The percentage of married in the population at large will be influenced by certain factors that have no connection with the propensity to marry in that part of the population that is placed before the choice: marriage or not. Age distribution is one. A high percentage of children will lower the percentage of married in the total population. Male surplus is another - partly by forcing marriage-age upwards in the manner we have described.

It is most interesting - perhaps - to see marriage in the context of total population in relation resources. By marrying late, giving birth to few children, killing children they could not afford to raise, avoid marriage increase in population could be halted. Apparently at least some of the clergy warned against sexual intercourse

that aimed at raising children but favoured it for health " or other reasons " (Ullmann 1970 p. 185).
It might well be - as Russell suggests - that poor people in hard times reacted to conditions of living by adopting one method or the other to limit their burden. The relation between man-power and resources are certainly complex- man is a factor of production as well as a burden of supply. But while we cannot consider children under all circumstances as a strain on re sources and not as a mean of providing for a family there are no reasons why they should not have been regarded as such in a lot of cases.

The signs of a population keeping down propensity to marry occur where we would expect to find it. There are low pertages married among early medieval serf-populations. In those cases where there are many married we shall find later that other checks to population were at work.

It might therefore be right not to put too much weight on the variation in percentages that are married. But if we compare conditions before and after the Black Death we see that there are more married in the countryside. This is in line with what is often considered to be one predominant trait in the period 1350 - 1500, diminished pressure on ressources, opportunities, partly realized, for increased standard of living.

Conditions in towns are different from the countryside. Mortality was probably higher, immigration played an important role. The economic and demographic environment is different from that in the countryside. We have no data to investigate further what brought the percentage married so low in late medieval cities, as for instance age-composition. We know there was a surplus of women. We can not exclude the possibility that deficient means for providing for a family played a role.

It is our impression that the data fit well to a conclusion that both age at marriage and percentage living in marriage show signs of responding to variations in population pressure upon ressources.

Female marriage before 20 years of age in average is present in the material. That it increased just before the Black Death might be seen as population responding to a

sort of " an ecological crisis" - that is too many people in relation to ressources, man acting as a consumer without technology and society that make him able to release his possibilities as a production factor.

It might be that the Early Middle Ages experienced a crisis. But we are here surveying the poorest segments of the population.

It is - however - commonly held that the 1600s experienced a crisis that bore some resemblance to the crisis postulated around 1300. It is therefore no surprise that village population in late 1500s show late marriage and that Hajnal's article documents later marriage in this particular period. Neither is it surprising that nobility still marries early.

In crucial respects conditions changed in Europe in Early Modern Period. Mortality fell, life expectancy increased, even the old marriage pattern that earlier had provided for stable population was therefore able to generate a big increase in population. That might provide why this became a particular "West-European"-pattern, other parts of the world still remaining under the old conditions.

Table 12 showes the percentage of population living in wedlock. The Roman percentage is a computed maximum made by J.C. Russell. It is based on a sex-ratio of 130 men to 100 women, marriage age 26 years for men,18 for women.

The first group of datas concern rural districts. If the Roman estimate can be taken as an indication of a level obtainable, we see that all samples except one gives results below the theoretical maximum. We also see from table 13 that not all men and women in suitable age in fact went into marriage. The exception is the case from villages around Paris. There was here relatively many men per 100 women, indicating killing of female babies. This meant that fewer couples couples could be made than in a population with a less distorted sex-ratio, while the average husband-to-be had to wait for a marriage.

The German evidence gives an only slightly distorted sex-ratio. This provides an opprtunity for making relatively many couples from the population. But here the rise in population is checked by people abstaining from marriage.

There were further variations in number of children per couple, as this is also an agent in regulating population.

So low is the percentage of marriage in the German case that Russell doubts that this particular sample at all managed to keep up its number.

The data from Marseille refer to serf-population on monasterial lands. This sample is reputed for its very low percentage of children. And also the percentage of married is low. In a population containing many adults one should expect the contrary.

In England in 1377 several waves of the Black Death had just passed the country. Russell propose that this might have taken many old people away and thereby raised the percentage. There was a greater male surplus in the smallest settlements in England. In spite of this the percentage of married is also highest here. A great number of men and women were unmarried in the bigger English settlements in spite of expected greater opportunity. This underlines the conclusion we made on page 24. It looks as if a large unmarried segment of population continued to exist in the towns while it waned in the countryside after the Black Death.

The Tyrolese villages show a very high rate of marriage. Circumstances look stabilized. There is a nearly normal ratio between men and women and people could afford to marry.

Looked apart from one case - the towns surveys from the Late Middle Ages show a small percentage married. It might also here be parts of the population keeping away from marriage.

Table 13 shows percentage married out of the adult population. This is based on those parts of the sources where population is divided on adults and children.

The distorted sex-ratio in the case from the Paris area is reflected in the big surplus of male among the unmarried.

In the two cases of Germany in the 800s and Tyrol in 1427 we have more detailed information about the population. This will be mentioned under family structure.

From England 1377 we can only relate the evidence from the towns to the adult population. We see that after the Black Death town population shows as little rate of marriage as the very depressed sample from Germany. For some reason cities in North Europe in this period also started to show a female surplus. We have also mentioned the fact that not everyone lived together in wedlock. Taken into account what we know from chapter 3.2 on working-conditions it might be a fair guess that to provide for a family might many times prove difficult and that large urban groups went unmarried. In addition came the threat of unemployment. The effect on social conditions in general is worth considering. So is the striking difference between town and countryside in this manner after 1350.

Table 14 shows average age at marriage, table 15 a distribution of age at marriage. First marriage is here considered.

The age of 14 was often considered a fair age for marriage for a Roman girl. It looks as if they were not far from realizing the ideal. 3 out of 4 were married before 20. The early marriages - so commom today outside Europe were a part of the European pattern in Antiquity. This is - however - tombstone evidence, probably somewhat biased towards the rich.

Also the English evidence from the Middle Ages reflects conditions among the welthier part of population. The marriage comes relatively late in life in the period 1270 - 1327, earlier after the Black Death. The reason might be improvement in economic conditions.

It is interesting to note the late marriage in a village-community in comparison. This is evidence from the less wealthier part of society. As age of marriage seems to increase as we move from periods when there was plenty of resources to those when there was not - so it increase as we move from the material re sourceful to the less resourceful people.

We have earlier postulated that age og marriage increased in Europe in the 1500s and 1600s. This increase made itself felt both among nobility and other classes.

Even after this period East Europe kept up the old pattern. We find the same pattern both in Roman Antiquity and non-European societies today.

We now see that periods experiencing some sort of " ecological crisis " show a tendency to adopt the same pattern - and that before the 1500s. So does our village from the late 1500s. While increased age of marriage might have been an adequate response to population pressure facing both the centuries and the poor in particular - variation in other demographic factors upheld a pressure towards high age of marriage.

So different they are - the condition under which the different groups lived - we would not expect to find an unanimous pattern. There are a lot of other factors that might have brought variation to this picture.

While the nobility hardly faced economic difficulties bringing up a large amount of children, a too large number might have endangered its social position by spreading the inheritance on too many heirs. We shall later see more evidence pointing in that direction that also noble families sometimes found demographic regulation necessary.

The Early Modern Period provides good examples of the effect of population being too big in relation to ressources - particularly in North Western Europe. In 1703 Iceland was forced to declare a population-stop. Marriage was prohibited unless it could be proved that the applicant commanded re sources to raise a family. The average age of marriage was pushed up to 40 years for men. While breaking of the ban occured - leading to parting by force - regulation in Iceland was sufficient to prevent any illegal baby-boom. Similar problems faced Ireland and Norway.

Table 16 present evidence from judicial papers - the relation between that number of women that at any age occur are married and that number that occur as not married. The not-married comprise both previously marriaed and never married. If we compare the first and the latest period there is a marked increase in early marriage. Note also the greater persistence of married women as age increase in the latest period. It might indicate that re-marriage was more complete in 1483-1509. Complete re-marriage is a part of

the pre-1600s marriage-pattern in Western Europe. It would not be surprising if late medieval population showed a return to this pattern after the difficult period around 1300.

We may also note that re-marriage appear not only to increase but also to be relatively complete around 1500. Mortality taken into consideration we would expect very many widows and widowers to occur within few years.

2.6 Fertility.

Under fertility we intend to study the fertility of the single woman or couple and the fertility of a population - that is its ability to reproduce itself.

The most common measure for fertility is the number of children born per 100 inhabitants. It might provide a rough measure for the reproduction of the population, sufficient at least for historical purposes. Its common occurence makes its necessary to mention for sake of comparison.

As it is influenced by factors like age-composition of the population and rate of marriage it provides a poor guide to fertility for the single couple. Exact reproduction measures is difficult to apply to historical material. Russell turns to number of children per woman or couple.

We are mainly interested in (1) The relation between the number of children and the growth of population (2) The size of the families.

To keep a population stable it is necessary that each couple gives birth to so many children that 2 of them survive the reproductive period. From expectation of life it might be proposed that something near 4 children born would be sufficient provided everyone married. Then there is infertility to account for. Not everyone married, children were exposed, some went unmarried and there are other factors that make it hard to arrive at conclusions.

The Huterites, with a religious duty to give birth, have about 10 children in average. It is normal that infertility is somewhat lower than among them. It is therefore

Table 17 Number of children born.

Period	Area	^Registrated children	Assumed born	Comment
900s	France	3.8	4.0	Nobility
1000s 1.half	"	4.2	5.3	"
1000s 2.half		3.8	5.0	
1100s 1.half		5.5	7.3	
1100s 2.half		5.6	6.7	
1200s 1.half		4.9	6.3	
1200s 2.half		5.1 (4.1)	6.4 (5.7)	One case of
1300s 1.half		3.7	3.9	22 children
1300s 2.half		2.8	3.3	
1400s 1.half		4.8	6.2	
1400s 2.half		3.7	4.7	
1500s 1.half	"	5.8	6.7	
900 - 1549	France	4.6	5.7	615 cases
Before 1300	England	4.7	5.4	Wealthier
1300 - 48	"	4.3	4.9	"
1348 - 1400		5.1		
1401 - 30		3.6		
1431 - 1500	"	4.1	4.7	
1486 - 1500	England	5.1	5.9	
Late medieval	Belgium	5.0	5.8	Villages
Late medieval	Poland	8.0	8.0	Gentry
Late medieval	Poland	10.0	10.0	Gentry, only fertile couples.

Source: Russell 1958 pp. 14 - 21

Table 18 Number of children surviving to 22 years. Medieval England.

Period	Surviving children
Before 1300	3.06
1300- 48	2.61
1348-1400	1.50
1401- 30	1.37
1431-1500	2.45
1486-1500	3.09

Source: Russell 1958 p. 20

to be expected that 7 - 8 children per couple is a sort of a maximum. As it is a fact that population has grown, the average number of children can not have been so great.

Table 17 shows the average number of children born per married couple. In the column to the right the numbers are adjusted for exposure of children. In these 615 cases from France - even if it is nobility - the ratio between men and women indicate exposure of children.

The English evidence is collected from judicial sources. The sample is biased towards the wealthier. The Belgian evidence is an ordinary village population.

In most of the Middle Ages population grew. The table gives an indication of how many children was required per couple to secure this growth. The 1100s and the first half of the 1500s experienced a rapid increase in population. We might therefore conclude that more than 5 surviving children provided opportunities for population increase. For what we know it was rather stable in the 1400s. It seems that something around 4 children were raised per couple in this period. So it might be that the difference between 4 and 5 children was the difference between a stable and a rapidly growing population, while a population with only 3 children per couple had difficulties in reproducing itself and was in numerical decline.

But the question of increase and decrease in population would - of course - not be determined by number of children alone.

It is nevertheless a striking similarity between the numbers in table 17 and what we would expect the medieval development in population figures to be. In those periods when we would expect medieval population to grow fastest table 17 shows the highest figures.

The table has a medieval peak in the 1100s - after climbing from the 900s figure. It is lower in the 1200s and falls steeply in the first half of the 1300s - just when we would expect population to be checked in the decades before the Black Death. From here it is climbing again to a new, high level in the 1500s. By and large we get the same impression from the English figures.

Taken into account the mortality of the period we would not expect these figures to give rise to large families. An exception is the Polish evidence from late Middle Ages. They probably show a sample from the population where all possibilities for raising children are exploited. They indicate that the French nobility - with the possible exception of the 1100s and the 1500s kept its fertility below what was possible. The differences in exposure-habits point in the same direction. It does not seem to have been a habit among the Polish gentry to kill babies.

It might also be worth noting the fact that the nobility reduced its number of children as drastically as did the common people - at least if we shall judge from the sex ratio.

Table 18 where we are looking at the number of children surviving to 22 years confirm that families were of decent size. Our suspicion that the number of children fell in the decades around the Black Death can be confirmed. In the period 1348 - 1400 it is the Death itself that is responsible.

Table 19 Birth rate. Births per 100 inhabitants.

Period	Area	Birth rate	Comment
1000-1300	Germany	4.2	
1300	"	4.0	Freund 1973 p.225
1300-1500	"	3.9	
1460s	Florence	4.0	At 62000 inhabitants
1470s	"	4.1	"
1457	Barcelona	2.8	At 40000 inhabitants
1483	"	3.3	At 30000 inhabitants
1489-90		5.3	"
1494		4.4	
1497		4.1	
1501		5.3	"
1520	"	4.8	At 40000 inhabitants
1530	Barcelona	3.4	"
1550-70	Florence	4.1 - 4.4	Census 1551, 1562
1551	Arezzo	5.6	
1565-75	Siena	4.4	
1501-14	Parma	4.8	
1575-87	Modena	4.4	
1580	Bologna	4.7	
1581,97	Genoa	3.7 - 3.9	
1606	Palermo	3.8	
1680	Germany	4.5	Freund 1973 p.225
1870	"	4.0	"
1913	"	2.8	"
1955	Germany	1.6	"

Sources: Russell 1958 pp. 19, 21, Freund 1973 p. 225

Table 19 shows the crude birth rate. We know from the study of the mortality-rate that it usually lay between 3 and 4 deaths per 100 inhabitants per year. In the Italian towns of the 1500s and 1600s it was around 3. These towns included the countryside under their jurisdiction what might have lowered their mortality.

The Italian evidence comes from baptism. Not all children were baptized by necessity. It looks as it was in the periods we have covered a surplus of natality over mortality in the towns. We then have to consider the calamities, famine, war and plague that in one single year might have carried away the surplus from many years increase in population. Russell argues that it was this pattern - slow growth and sudden setbacks that characterized the demographic development in this field.

2.7 Age structure.

The age-structure of the population influence the social and economic conditions of a society in many ways. We have already noticed - in connection with the relationship between population and economic resources - that man enter into this relation both as a producer and a consumer. In connection with the age-structure, some age groups are mainly consumers, some mainly producers. We will assume that this distinction might be a useful one - although there clearly are more ways than one for dividing a society's activity into consumption and production.

For instance - while most of the activity producing a society's material product and services is conventionally regarded as production, housewives work might from some viewpoints be regarded as production. The children's time spent in education - a great resource - might be looked upon as consumption as well as one way cho sen for the optimalization of resources available for production.

Any conclusion must further take into account that pre-industrial society hardly allocated its time or man-power

in the same way we do. We have to take into account in what part women participated in work. Not only in agricultural work and housework, but also in services and industrial activities. The same goes for children - also in an industrial environment. We also have to consider when the old were taken out of production. Changes might have occured - probably in direction of a later age of pension - that might have nullified demographic changes towards a larger population of older people. Finally the resources allocated for the upkeep of the old and the young might have changed.

So our opinions of the interplay between age-structure and economy will depend upon our view of the pre-industrial society in general. So far we have collected little material both for age-structure and pre-industrial society in general, and the conclusions must be a rough scetch.

What is certain is the similarity between these old urban societies and modern developing countries. It might indicate that conditi ons might be similar. But modern developing countries are in a state of rapid population-increase with low mortality while the two urban societies were in a state with a relatively stable population and a high mortality - at least if they followed the pattern that was usual in Europe of the 1500s.

The ancient societies might have had a heavy "burden" of children. While 1/3 of the population was under 20 years in a modern industrial society there was c. 55% in Pozzuoli, 1489 The "thumb-measure" for pre-industrial societies goes that ½ was children and "old", ½ in the age where a man was reliable for conscription - often considered as the age-groups from 18 up to 60 though it might have been some variation. Our thumb-measure holds roughly, as there were not many in the old ages. But we cannot put too much into these few figures - exposed as the population was to war and famine that might have drastic effects upon population.

So the upkeep of children must have weighed, and society was not always far from the margin. economic results were counteracted on the side of production: children were put to work from the age of 4 in the industrial sector. (Kellenbenz 1973).

Children that went to school must have meant a relatively large transfer of resources from production to education - or a re-transfer from one economic purpose to another depending on how one would perceive education. This must - however - be subjected to argumentation. There are periods of different intensity in the agricultural sector that satisfied the most basic needs and where the margin for survival was most important. A.H.M. Jones argues in the concluding chapter in "Late Roman Empire" (Jones 1964) that a burden of idle mouths weighted down the Roman Empire. While that function of children shall not be forgotten - it seems more probable that their function as a productive factor was more important, that they were raised to exploit all possibilities in economy - that the elastic agricultural economy could take care of the educational activity mentioned in chapter 3.4 without diminishing its gross-production.

At times there existed some sort of a governmental pension - as those over 60 were exempted from tax. If the tithe in fact reached 10% of gross production and re-investment in seed was 1/3 of gross-production (3 fold) then 1/4 of the tithe or 3.75% of net-production was distributed for social purposes. According to law at least. There were certainly other means of providing for the old.

For a society that - as a whole - is on the margin of subsistence and where a section takes more than their part 3 - 4 % might not be as little as it can sound. If the rest of production is meant to provide a family with facilities for heavy work, 3 - 4 % measured out in subsistence rations might on the other hand be sufficient for a large part of population. For survival alone - that is.

In our old urban societies 1 - 3 % were over 70 years of age, 4 - 8 % over 60, the approximate age of pension if exemption from tax provides any clue at all. Until recently the age of pension in Norway was 70 - that is c. 8 % of the population. So the "burden" of the old to society might be compared if the conditions offered them

can not. If the society cared for them at all - that is their families or other institutions - a subsistence-ration might count in the economy. Of course there are other aspects to the matter - as the independence offered by modern social security.

As there are more children and might be as many "old", there are also a bigger percentage in the age-groups up to 35 in the old urban societies compared to the modern. Norway raised few children in the 1930s, a fact that might concern table 20. But table 20 reminds us also that even within the so-called productive ages the old urban societies seem to have a bigger part of its population in the younger groups than the modern. Our stress on the preponderance of the old and young does not imply that the productive age-groups were small and working started earlier in life.

We have so far been little concerned with differences between men and women in the population. It is difficult to see how a family could be maintained on what was considered as a working-man's wage. And we shall note the role of women as wage-labour. To-day women are still mainly engaged in organizing family's consumption, her home-production being partly transfered to industry during the industrial age. There might also have been a transfer of women's working-capacity from the other sectors to the home. We are here thinking of the non-agricultural sector. If more human activity is considered as a part of economy than pure production alone women must count for as much as men, and this movement of women in society must be worth studying.

We mentioned the similarity between modern developing countries and our urban cases from table 20. India, Egypt and Indonesia - for instance - range from 41. 6 to 44 % in part of the population being 14 years or younger, from 2.3 to 3.5 % in part of the population being 65 years or older. (Yearbook 1972 p. 358). They live - however - under economic conditions different from those in Early Modern Europe, a difference that should not allow us to jump to conclusions.

Table 20 Population distributed on sex and age.

Age	Pozzuoli 1489 Male	Pozzuoli 1489 Female	Sorrento 1561 Male	Sorrento 1561 Female
0	2.0	1.7	0.9	0.5
1- 4	11.8	13.5	10.9	11.8
5- 9	14.3	14.1	10.0	11.6
10-14	15.4	12.5	8.0	9.8
15-19	12.6	12.3	11.5	10.7
20-24	9.6	9.8	10.2	7.7
25-29	7.7	7.2	10.3	8.4
30-34	8.0	4.8	7.6	6.3
35-39	3.6	5.1	7.1	6.8
40-49	7.9	7.0	9.6	11.1
50-59	3.3	5.5	6.7	6.8
60-69	2.4	3.3	5.1	6.4
70 or more	1.4	3.3	2.6	1.7

Sources: Russell 1958 pp. 31, 32.

Age	Norway 1970. Both sexes
0- 4	8.5
5- 9	8.1
10-14	7.9
15-19	7.8
20-24	8.1
25-29	6.7
30-34	5.3
35-39	5.0
40-44	5.6
45-49	6.4
50-54	6.4
55-59	5.9
60-64	5.3
70 or more	8

Source: Computed from Yearbook 1972 p. 10.

Apart from economy - some more positive conclusions might be reached as demography is concerned. We have pointed out that old people might have lived under similar demographic conditions as to-day. We now see how many they were. Everything concerning youth must have been relatively more important as they were more numerous. Marriage ought to have occured more frequently. In those age-groups where they married - then and now - there were relatively more people in the ancient society than today. That marriage lasted for a shorter time - due to mortality - and that people usually re-married - contributed to a further importance of the phenomena of marriage. Some of these things we might also find in modern developing countries.

Table 20 presents the population of two minor Italian towns, a material that might have been liable to the hazards of Ancient demography. There is an obvious error for the first year of living. Even the Pozzuoli-figure is somewhat low.

Table 21 presents the size of certain age-groups that are often counted separately in the sources. The Roman figure is an old "Thumb-rule" - used by most authors to find the population from the number of conscripted soldiers. 18 or 20 years was usually the lower limit, 60 years the upper - that might vary, a fact that must be taken into account in connection with the figures.

The conception of "children" might also vary. Tentatively we may suggest 14 years as the upper limit. Perhaps the new-born have not entered into these figures either. Political difficulties often precipitated the taking of a census. That might also have some influence.

1/3 children in a population might perhaps be regarded as less normal than 1/2. The wages reported from towns were not always sufficient for a family and many might have prefered to remain un-married. In general the towns show less children and also smaller families than the country-areas that are represented.

Table 21 Population distributed on certain age-groups.

Period	Area	Percentage conscripted	Percentage children	Comment
Roman	Roman	25^		
800s^	Paris area		50.3	Villages
800s	Germany		50.2	Villages
1218-22	England		45.9	37 cases
1266-72	England		36.8	26 cases
1427	Tyrol		51.8	Villages
1447	Freiburg	22		
1449	Nurnberg		35.6	City
1449	Nurnberg		44.3	Country
1400s	Nurnberg	26		
1400s	Ypres	24		
1509	Venice	32.6	31.9	

Sources: Russell 1958 pp. 13 - 18.

Table 22 Size of family.

Period	Area	Persons per family	Comment
Early medieval	France	3.38	Village
800s	Paris	3.6	Own children only
800s	Paris	4.57	All children.
800s	Germany	4.46	
1218-22	England	3.7	
1266-72	England	2.8	
1377	England	3.5	National survey
1427	Tyrol	3.7	Persons per hearth
1449	Basel	3.5	
1449	Dresden	3.3 - 3.6	

Sources: Russell 1958 pp. 13 - 18.

2.8 Family structure.

We presume that children were numerous, but were families necessarily large? Evidently family can mean so much. Due to the mortality there would be no surprise if there were a great deal of orphans. Becoming the lone provider of a family does also seem possible. Even if most re-married a period of statistical significance may have lapsed.

Even if a family in general consisted of many people a great deal of single individuals in society might have the effect of bringing the average down. It will help us that we have a regular distribution to study.

As for the family outside the household unit: In "Feudal Society" M. Bloch consideres the family at large as being not very different from today. The great clans disappeared in most of Europe in the Early Middle Ages. Brothers, sisters and first cousins mattered, little contact remained with the other relatives.

There were 3.36 persons per household in Norway 1950. (Yearbook 1957 p. 25). There were 2 - 4 children per marriage. About 25 % had 3 children, a little more than 20 % had 4, an equally large part had 2. The biggest families reported in table 22 is 6½ in Germany in 800s, but then orphans are counted, with only own children it makes 4½ per family. The same is reported from Tyrol in 1427 what we earlier have considered a case from a prosperous area and relatively prosperous times.

Table 23 has an average family size of 2.51. 1/10 of the cases are families with women as main person. Further 1/10 are described as widows. Some mothers were apparently never married. Looking to modern condition and remembering the everlasting struggle for food - it might not be surprising that these families are the smallest.

Table 23 Families distributed after size. Überlingen 1400s.

Persons per household	Percentage of all households	Percentage of house-holds with female main person	Percentage of adults
1	18.9	72.6	7.5
2	41.4	15.9	33.0
3	22.2	7.6	26.5
4	9.6	3.2	15.2
5	5.2		10.3
6	1.7	0.6	4.1
7	0.4		1.3
8	0.3		1.1
9			
10	0.2		0.9

Source: Russell 1958 p. 53

Table 24 Sex ratio deducted from mortality-rates.

Period	Area	Age 0 (assumed)	All ages	Above 20	Above 40
Roman	Spain	100	117	134	166
	Africa	100	102	110	115
	Rome	100	93	112	156

Source: Russell 1958 p. 14

Table 25 Sex ratio.

Period	Area	Sex ratio	Number of men in sample	Comment
Roman	Africa	140	6238	
	Italy	140	1055	
	Rome	131	4575	
	Spain	126	1111	
	Egypt	105	367	
750- 97	Germany	115		
800s	Paris	126	2438	1942 women
800s	Amiens	95	95	
800s	Germany	107		
1200s	England	100		Wealthier
1300- 50	"	133		"
1350-1400	"	100		".
1218- 22	"	76	16	
1266- 72	"	136	15	
c. 1350	"	170		Serfs
1300s	Florence	115	3000	
1377	England	111	Population	Small places
1377	"	95	"	Colchester
1385	Frankfurt	91	"	
1400- 50	Nurnberg	84	"	
1400s	Arezzo	105	"	
1400s	Freiburg	83	"	
1400s	Basel	93	"	
1400s	Dresden	105	"	
1427	Tyrol	112	844	
1506	Ypres	83	Population	
900s-1500s	France	162		Nobility
Late medieval	Belgium	149		Villages

Sources: Russell 1958 pp. 14 - 32.

2.9 Sex ratio.

In this article sex ratio is the number of men per 100 women. The higher sex ratio - the higher male surplus. Sex ratio is often easy to find and compute - and rather interesting conclusions might be drawn from the evidence.

Table 24 shows that killing of children might not have been the only factor responsible for pushing up sex-ratio. We have earlier noticed the higher female mortality in many age-groups - especially in the fertile ages.

Table 25 presents a sample of sex-ratios. They are well distributed - both regionally, urban/rural and over sicial groups. We have 5 cases from Roman provinces presented. They all show extensive killing of female babies except Egypt. This practice is also reported from literature. The four cases from the Early Middle Ages vary in sex-ratio. We have here to consider their demographic situation as a whole. High sex-ratio obviously act as an agent to keep population down. If this is taken care of in other ways sex-ratio becomes less important. So Germany shows many unmarried but many children per married couple and a low sex-ratio. The sample from the Paris-area so normal in other ways - have a distorted sex-ratio.

From the High-Middle Ages we see the increasing sex-ratio in England before the Black Death. That it is especially marked among serfs is natural. It is more strange that French nobility should have shown such high sex-ratio.

From the Late Middle Ages we note the difference between Italian and Northern towns. The latter have a surplus of women, uptil then apparently unusual in history.

2.10 Migration.

Obviously people moved, often in great numbers. A migration that takes place over a long period - with a population that has got time to keep up its number , might in the end take out a great percentage of the original population. Table 26 often shows high figures. As Germany was not densely populated around 400 it is easy to imagine the losses. In some cases percentage for migrants are omitted as it is not clear what area is the right to take for comparison. As for the crusades - about the half reached Syria.

Note that the population figures is taken from Some longitudinal tendencies I in this programme.

Table 26 Migrations in history.

Period	Migrated out of	Migrated into	Migrants Thousands	Percentage of population emigrants	immigrants
60	Roman	England	100	0.1	20.0
406	Germany	Roman	7-800	c.25	1.5
440	Germany	England	200	c. 6.66	50.0
1096	Europe	Syria	330	c. 1	-
1147	Europe	Syria	240		
1189	Europe	Syria	350		
1202	Europe	Syria	30		
1218	Europe	Syria	30		
1228	Europe	Syria	70		
1685	France	Europe	250-350	1.25-75	-

Sources: Collingwood 1937 p. 181, (Roman England), Jones 1964 p. 1113, (year 406), Russell 1958 p. 39 (year 440), Buccholz, Kirsten and Köllmann 1970 p. 4 (the crusades), p.20 (1685),

Table 27 Migrants in percentage of population.

Period	Area	Migrants/year	Population '000s	Migrants per 1000 per year
1300s	Lubeck	179	18	10
	Stralsund	123		
	Wismar	40 or more		
	Hamburg	40 or more	22	2
	Bremen	40 or more	18	2

Source: Pounds 1973 p. 340

Table 28 Distance travelled by migrants.

Distance travelled km	Migrants distributed after distance travelled. Beauvais/Douai Percent	Toulouse Percent
Over 125	2.5	7.1
101 -125	1.0	3.0
76 -100	5.3	12.1
51 - 75	11.2	20.0
26 - 50	27.7	36.3
1 - 25	52.2	21.2

Source: Pounds 1973 p. 340 393 cases reported.

Table 27 shows the percentage yearly immigrated to a number of German towns. If a town got 1 % in addition per year a great part of population must have been migrants.

Table 28 shows the distance they travelled. Most came from the market area - and the biggest towns drew from the greatest area.

3. BASIC NEEDS: FOOD, HOUSING, HEALTH, EDUCATION.

3.1 Introduction to basic needs.

A population of one million has a total experience of about 9 milliard hours through the year - sleep included. A distribution of this amount of time on the various social and economic activities might remind us that that all activities - also work - might sometimes with advantage be seen within a broader context.

A modern student occupied with the subject death states that any society has its death-cult and proceeds to ask : What is ours? Our society has a cult of death. The sometimes sour reaction to questions like this might be suspected to inherit something from the contempt for non-western societies so fashionable in the 1800s.

A similar question might be asked for education. What was the ancient form for education? A description of the total body of educational activity might be a personal choice. But we are not prepared to limit our conception of education to the institutions concerned with education. Some of the increase in educational activity is mainly a transference of the activity into institutions. As vocational training has been moved from factories and learning by work and into purely educational institutions.

The greatest part of the income in earlier ages was of course devoted to food. It consisted of a simple diet - peas, legumes and inferior types of cereals. In Early Modern Period potatoes were added - in Northern Europe that is. One should not disregard the additional foodstuffs that could be added by collecting - above all from the forrests. Negligible as it probably was when it became a question of survival there might have been a great deal of time devoted to it. One important point is the role of food in the "economy of time" - that is one allocate ones time to satisfy ones bodily

and other requirements. Food was a matter of life and death, but this does not imply that the entire working year was devoted to it. A limiting factor in society was the relation between cultivated soil and population. But when cereals had been collected - be it in sufficient amounts or not - there was time left. (Postan 1966 ed.). More surplus of time there was in dairy- and stockraising areas - probably it was the organization of this time that formed the basis for medieval and early modern manufacture.

Then there is the problem of wages, prices and standard of living. It is a recurrent problem how to treat an amount of money expressed in ancient currency. To express silver currency in terms of present value of silver does not seem fit. But gold has kept its value more stable - the amount of gold contained in one solidus expressed in present gold prices gives a far hint of what a solidus really was. It goes without saying that a solidus gave people command over thing - food for subsistence, property-rights, productive items and services, command over working-capacity inherent in a human being and command over time. A solidus expressed in dollar will differ from case to case. A man's productive capacity for transport has probably increased - even if one takes account of the time capaitalized in vehicles and roads. But one should not put all interest in the productive result. If 100 people performed transport work in Antiquity and 100 other in 1975 there is a similarity in the two cases that can not be ruled out with the argument that the former produced less.

Certainly everything fluctuates in such comparison. The problems - although to a minor degree - is well known in international comparison to-day where exchange-rates might vary depending on what one tries to elucidate. It seems clear - despite all incertainty - that variation in the relation between gold and working-time, between working-time and food can be stated.

3.2 Wages, prices, consumption.

Tables concerning money expressed in various currencies and over long time-interval require special explanation. They can be expressed in a common denominator like gold - but relative to working-time gold has changed its value. It looks as if in Athens in the - 400s work was relatively well paid in terms of bullion (silver but expressed in gold according to the prevalent rate). So work was well paid in bullion in the 1500s and in industrialized countries to-day. In many non-industrialized this is not the case.

While bullion provides us with a possible common denominator much bullion received does not mean high real wages. What counts after all is the goods acquired. Then there is the problem how much money-wage counts at all. Self-sufficiency might add considerably to the standard of living. New items are introduced throughout history and make possible increased standard by increased choice. Finally there has been dramatic developments in the relative prices.

In the satisfaction of basic needs - working-hours is another factor to pay regard to. Apparently it changed through history. We have further presented some data on the consumption of alcohol (table 30).
The data has been converted into litres. The last data has been converted from 50% into pure alcohol to make comparison possible.

Table 29 Working hours.

Period	Area	Type of work	Days worked per year	Hours worked per day Summer	Winter
1356	Xanten	Mason	270½		
1356	Rochester	Mason	250		
1368	Rochester	Setter	150		
1450	Nurnberg	Artisan		13	7
1641	Munchen	Landworker		11	
1768	Kiel	Journeyman		12	7
1806-33	Schleswig	Artisan		10	6
1840	Germany	Industry		14	14
1880	"	"		10	10
1918	"	"		8	8
1957	"	"		9	9

Sources: Freund 1973 p. 269, Postan/Rich 1952 p. 514

Table 30 Consumption of alcohol.

Period	Area	Litres consumed per inhabitant	Comment
1710	England	1.7	
1745	"	5.0	
1750		4.6	
1760		1.5	
1780	"	1.5	
1795	England	2.5	
1833	Norway	c. 8.0	16 litres brandy.
1965/69	"	1.6	Legal, pure.

Sources: Taylor 1969 p. 110, Jensen 1949 p. 270, (1833) +)
Yearbook 1972 p. 418.

+) From: Jensen, Magnus 1949 Norges Historie; Oslo.

Table 29 shows working hours from the Middle Ages to the Present. Standard of living is not determined by wages and prices alone. We must also take into consideration other factors - among them the working-hours. There has been differences during history. At the time of the industrial revolution wages were apparently earned during long days of working. Many places employment in manufacture fell in percent of labour-force. But the new and more expensive machinery probably meant working for a greater part of the year - the old seasonal work in manufacture coming to an end. But not only were there (relatively) fewer workers working for a greater part of the year - they also worked more hours a day. On the other hand - more continuous work might have meant better wages, at least where manufacturing was not the sole occupation. Where this was the case - wages must be sufficient to carry the workers through the season when manufacture lay down - as in the Northern saw-mills when rivers were frozen.

If one day a week is free - 313 out of 365 will remain for work. 10 days for holydays is not unusual. Two days off a week makes a further 50, 4 weeks vacation 22 (if two days off). Under these conditions c. 225 days a year will be devoted to work. And we see approximately what the medieval holydays meant to the worker, at least in the construction-industry. Holydays account for the relatively few days worked a year.

In the Mediterranean area work lasted from sunrise to sunset - with a break at mid-day. This was difficult to use further north in summer. Government engaged in regulating hours. A strong government - hostile to the workers might try to enforce no break - what probably increased working-days with two hours if respected. This was the case with France under Phillip 5. Workers had to eat while they worked. In Belgium breaks was legally acknowledged, and in some Belgian states - as

in Brussels - workingmen went for more breaks.

A week of 6 days seldom occured. Saints days were observed. But a year of 180 days probably includes a low season.

1/3 of the wage went out in food and drink for subsistence. While giving one man a living it was not sufficient for a family. For a family it would be necessary that the wife had work. (Postan,Rich 1952 p. 514).

Overtime was unknown in tne Middle Ages - but occured from the 1500s when workers tried to close the gap between prices and wages.

3.3 Housing and settlement.

10 - 20000 inhabitants per km^2 was the normal for bigger citie in the Middle Ages. This would be a dense population also to-day. A densely populated town like Paris has c. 30000 while half of this is customary..

There were normally 25 houses per hectare (Russell 1958 p. 63). The average city-house had 4 inhabitants. Normally the houses had a ground-floor and one floor above. At 25 houses per hectare each had 400 m^2 in average. The property was normally organized as a lot - with a house and a cottage behind. Many inhabitants were engaged in agriculture - 50% in the small - 5% in the biggest. Cities under 2000 inhabitants were predominantly agricultural. (Pounds 1973 p. 354).

Table 31 shows some cases of medieval density in cities, metropols and small cities, Northern and cities in the Mediterranean, pre-plague and post-plague. The density is not very differnet from small to large towns. It is a little greater along the Mediterranean. It falls after the Black Death. 2.5% of the population probably lived in towns in the late 1400s in Western Europe. (Mc Evedy 1972b p.24).

Table 31 Density of population in some medieval cities.

Period	City	Inhabitants in thousands	Inhabitants per km^2
1086	London	18	10800
1377	London	35	12100
1292	Paris	59	15700
1381	Florence	55	10700
1424	Florence	37	7300
1359	Barcelona	27	10400
1514	Barcelona	31	11800
1363	Venice	78	24000
1200s	Milan	52	16600
1371	Bologna	32	7600
1332	Toulon	3	15500
1377	Canterbury	4	9700
1377	Winchester	2	3900

Source: Russell 1958 pp. 60 , 61.

Table 32 Buildings in a city in Antiquity. Roman Alexandria.

Type of building	Number 1. Century	Number 300s
Temples	2393	2478
Courts	8102	6152
Baths	1561	500
Taverns	935	845
Houses	47790	24296

Source: Russell 1958.

In Netherlands and Italy it was 10% and in parts of the Netherlands 30%. It doubled till 1600 (Mc Evedy 1972b p. 38), and doubled again till 1815 - when it reached 10 %. (p. 88). In England and Scotland it was twice as much.

Table 32 concerns Alexandria. It must be mentipned that at the height of its Roman prosperity the town probably had 300000 inhabitants - that make 6 per house.

The health-service - if a public bath can be described as such - and religion is apparently well provided for in terms of building. We have so far only been able to cover the problem of housing very lightly. Considered in connection with what we know about family-structure it might be argued that family-life was not so different from ours as is sometimes said. Where is the big family living in common and being the carrier of all kinds of solidarity - the bulwark of good old times that fell in front of the industrial revolution? Rather urban life gives an atomized impression - and in the late Middle Ages urban life was already of some improtance.

Table 33 Persons per household and per house.

Period	Area	Persons/household	Persons/house	Comment
1364	Augsburg		3.5	
1471-75	Basel	4.1		
1497	Basel		5.1	
1587	Seville		8.4	City
1587	Seville		4.3	Bishopric
1597	Madrid		6.5	

Source: Russell 1958 pp. 51 - 53

3.4 Health.

The greatest difference between mortality-pattern in Antiquity and in the Present occur in the ages from 15 to 40. What brought this mortality-pattern about? Only few diseases strikes more heavily between 15 and 35 than at other ages - the most important of these is probably tuberculosis. J.C. Russell attributes to the tuberculosis much of the responsibility for the high mortality among the young in earlier ages.

Statistical Yearbook of Norway 1972 indicates (table 52) that 50 - 60 % of deaths occuring between 15 and 19 years of age around 1900 was due to tuberculosis.

The " White plague" - tuberculosis breaks out at 15 to 25 years of age - just when the mortality rate in Antiquity started to rise. It might be - however - that the disease was relatively recent in the Mediterranean world (see Russell 1958 p. 38). It might have had the same epidemic character as it assumed when Europeans brought it overseas. Resistance in population and immunity might have developed over time

Table 35 shows evidence from Norway. They are higher than those Russell presents from U.S.A. They are even much above the rates for colored Americans with their assumed lower degree of immunity due to a shorter period of adaption for the black compared to the white.

Malaria, smallpox and syphilis are other diseases we know were widespread. The most dramatic disease appears to have been the plague. The bubonic form is the most common - spread by fleas and rodents. This from of spreading might have caused some areas to have escaped with lower loss of population than others. There were big plagues in - 426 and + 166 although we do not know their exact nature. Plague-attacks in the 200s apparently took a chacter with a return every tenth year. This character - with an attack every tenth - less common every fifth- year

Table 34 Ancient and modern mortality-structure compared.

Age interval	Deaths per 100 within age interval	
	Roman South Italy	Norway 1871 - 75 Male
0 - 4	28.5	22.5
5 - 9	9.8	3.7
10 -14	9.1	2.1
15 -19	15.2	3.0
20 -24	17.1	4.7
25 -29	19.2	4.7
30 -34	17.3	4.5
35 -39	18.9	4.6
40 -44	24.9	5.0
45 -49	17.8	5.6
50 -54	26.5	8.2
55 -59	18.4	10.0
60 -64	34.7	15.0
65 -69	19.2	20.5

Source: Russell 1958 p. 27, Yearbook 1972 p. 25.

Table 35 Mortality-rate from tuberculosis. Norway 1896 - 1900.
Deaths from tuberculosis in percentage of all deaths.

Age interval	Men	Women
5 - 9	41.1	51.6
10 -14	45.5	61.4
15 -19	51.7	66.3
20 -24	54.7	64.2
30 -34	46.1	55.5

Source: Yearbook 1972 table 52, table 35. Deaths refer to the period 1900 - 04.

Table 36 Estimated plague-losses.

Period	Area	Estimated loss. Percent of previous population
543	Byzans	50
1346-77	England	40
1340-57	Aix	31
1343-57	Albi	50
Black Death	Provence	35
1328-95	Normandy	41
1346-63	Catalonia	35
Black Death	Norway	36
1348-51	Sweden	42
1348-50	Europe	20 - 25
1656-57	Genoa	32

Source: Russell 1958 p. 41, 42.

Table 37 Estimated war-losses in European wars.

Period	Area	Losses in thousands	Percentage of population lost
1618 - 48	Germany	10000	40.0
1756 - 63	Preussia	675	15.0
1870 - 71	Germany	43	0.1
1914 - 18	"	2050	3.0
1939 - 45	"	7000	10.0

Source: Freund 1973 p. 343

Table 38 Some major famines.

Period	Area	Percentage loss of population.
1315-17	Ypres	10
1695-97	Finland	25

Sources:

Bautier 1971 p.189
Aschehoug encyclopedia vol. 6, p. 614.

occurs very often in connection with plagues.

Marriages and births increased during plagues, but this might have been due to increased baptizing of children. Usually death-rates was higher after a plague-attack - the population appears to have been weakened. Plagues were especially fatal to pregnant women. Very serious plagues attacked pregnant women so hard that it could not be counterbalanced by the fact that wedding increased and there were born more children afterwards. Plagues attacked young children with ease and mortality increased with age. This might account for the high mortality among the clergy. The social effect might have been considerable, and plague-attacks were corducive to great migrations.

There remains war and famine to attack the population. It appears that both these might be equally hard as a plague - although not every war brought casualties but often stimulated childbirth during garrisoning.

3.5 Education.

Education in society is not just schooling. More or less organized education takes place in any society. What is easiest to study is the institutionalized learning.

Schools have existed from the oldest societies in the form of Egyptian and Sumerian temple schools. From the Late Roman Empire primary education was looked upon as a public matter. There existed also in the West ambitious plans for a system of primary - parish-schools, secondary - cathedral-schools, and tertiary - monasterial and palace-schools under Alcuin and Charles the Great. On the tertiary level Europe came to place much of its educational activity within the universities, from 1400s and 1500s also the academies.

Table 39 shows the extent of literacy in Europe. The European figures are from Mc Evedy and concern Northern Europe. The Preussian are from Freund. The Toulouse-evidence is based on evidence from marriage-contracts, that part of the population that at marriage showed ability to sign its marriage-contract in a proper way.

Literacy is only one aspect of education. The education system was badly hit by the Reformation. It might be that conditions for parish-education was better in the Middle Ages than in the 1500s and 1600s and that these centuries mark some sort of a bottom. (Cfr. Le Roy Ladurie 1974 p. 156).

Table 39 Percentage literated in Europe.

Period	Area	Social class	Percent literated Men	Women
c. 1500	Europe		5	
1749 - 85	Toulouse	Lower middle	90-100	67-75
1749 - 85	Toulouse	Upper working	51- 54	18-19
1749 - 85	Toulouse	Lower working	19-26	0- 4
c. 1815	Europe		50	
1820 - 25	Preussia			42
1836 - 40	Preussia			75
1846 - 50	Preussia			89
1901 - 05	Preussia			99

Source: Freund 1973 p. 762, Mc Evedy 1972 b p. 4, (Europe)
Hampson 1968 p. 139. (Toulouse).

Table 40 Schooling in Early Modern Europe.

Period	Area	Type of school	Number of pupils Thousands	Percentage of pupils among children.
1780s	Poland	Secondary	14 - 15	
1796	Russia	Primary	17	0.5
1796	Austria	Primary	200	10
1819	England	Primary	675	40 - 50

Sources: Cambridge vol.8 p.341(Poland), Aschehoug vol.3 p. 494 (Russia, Austria), Taylor 1969 p.107 (England).

Table 41 European universities.

Period	University	Number of students	Source
1294	Bologna	2000	Lopez 1971 p. 126

Table 42 Prices on books.

Period	Area	Book	Price/Cost
300s	Roman	Illuminated New Testament	3 solidi
819	Europe	Augustine's Commentary	8 days work
823	Europe		3 ½ months work
1700s	France	Emile	15-18 livres
1700s	England	Systeme de la nature	15 shilling
1700s	England	Encyclopedie	14 pounds
1700s	England	Pamphlets of Voltaire	2-3 shilling

Sources: Jones 1964 p. 849 , Wolff 1968 p.59 , Hampson 1968 p. 132, 135,

Table 43 Titles published per year.

Period	Area	Titles per year Thousands	Titles per million inhabitants
late 1400s	Europe	1	
late 1500s	Europe	2	
1565	Germany	0.5	
1618	"	1.75	c. 70
1635	"	0.25	c. 20
1700	"	0.75	
1800	"	3	
1815	Europe	20	
1840	Germany	11	
1913	"	35	c. 500
1938	"	25	c. 350
1955	"	17	

Sources: Freund 1973 p. 287, Mc. Evedy 1972 b p. 4

Table 44 Inhabitants per newspaper. Germany 1750-1955.

Period	Inhabitants per newspaper
1750	225
1850	30
1885	6
1910	4
1955	3

Source: Freund 1973 p. 401.

Table 4 2 shows development of book-prices through history. If it shall be of any value it is necessary to relate the figures to more commonly known values.

3 solidi would mean a subsistence-ration. Soldiers in the 300s got 10 solidi while the better paid soldiers of the 100s had got 30 solidi equivalent. The medieval-evidence is given in work. Speeds in copying varied considerably. It might be worth noting that it probably increased through the Middle Ages as abbreviations were systematically applied. Copied on papyrus - the cost for writing-material should count for little, but parchment was expensive.

The poorest groups of families in England 1688 - the cottagers had an income per family on £ 6½. A labourers family is estimated at £ 15, an artisan at £ 40. These incomes might be earned by more than one person.

4 SOCIAL DIFFERENTIATION.

4.1 Introduction to social differentiation.

The chapter on social differentiation is occupied with status and property, with occupational categories, with poverty and slavery.

So far there are questions that could deserve a closer investgation. The basic importance of agriculture can not be denied. The amount of food available was limited and relatively inflexible. It might be that in a time-account agriculture will play a more humble role. Still increased surplus must be bought with much time. This opens a sector where spare-time can be used. Compared to agriculture supply is more flexible. Their prices are - compared to food-prices - increasing less and falling less. A regional division of labour is well developed in many regions considered undeveloped today. There are no obvious obstacles to an extended trade in earlier periods. And the data we have so far indicate that industrial and service-sectors of economy are to be taken serious. This goes also for the army.

The first impression from the tables on stratification was a sense of familiarity. Society differs not so much from ours as we had expected. In the countryside the relation 2 : 3 : 5 between peasants producing for sale, for consumption and labourers with more or less soil of their own are found in a number of places.

Poverty was endemic. Though we are informed about the urban areas. It has been argued that education suffered from the religious struggles of the 1500s. As a large part of the social services was taken care of by the clergy it should be interesting to know how the situation of the poor was influenced.

4.2 Clergy and nobility.

Admission to the clergy and the nobility was often connected with some sort of a seremony and regulated by law. They often stood out conspiciously from the rest of society. These facts make them somewhat easier to estimate numerically than other groups in society.

During most of European history the clergy forms a well defined body. Its predecessors in the Greek and Roman world are less easy to determine. Connected to the clergy there was a number of helpers in the ecclesiastical duties that ought to be taken into consideration.

As for thir functions in society they form - together with the nobility - the main part of the body of government. There are the religious duties - marking out the main events in the lives of the population. Education and social services belonged mainly to the clergy during the Middle Ages to be transfered to separate professions later.

The nobility was not always a well limited body of government servants. They might appear as a class comprising the richest segment of society - with no particular public duties attached to it, a condition close to what seems to have been the case with the Senatorial nobility in the Late

So very often nobility is a class of administrative-military bureaucracy. From their ranks were recruited the public or royal service. Sometimes they monopolized these positions. Their upper ranks were - as a rule - rich. In order to maintain their functioning they had to command some resources. But when nobility forms 1/10 of the population - and the total exploitation has its limits of course - it cannot have been so much for each. That nobility was so large was seldom. Bot noblemen could - at the side of a church commanding so much of the soil;s resources - have exploited many peasants each - on the average.

Table 45 Percentage of clergy in population.

Period	Area	Percentage of population	Percentage of adult men	Comment
1294	Bologna	3		
1350	Europe		c. 0.1	Fransiscans only
1384	Trevisc	3		
1385	Toulouse	11.6		Students included
1400	England	0.7		All clergy
1350	"	0.4		Regulars only
1422	"	0.5		"
1500	"	0.4		"
1449	Nürnberg	1.6	5.5	
1497	Basel	5.6		

Sources: Lopez 1971 p. 126 (1294)
Russell 1958 p. 44 (1350), p. 32 (1384), p. 119 (1385).
Hay 1973 pp. 58 - 59 (England).
Russell 1958 p. 16 (1449), p. 51 - 52 (1497).

Table 45 shows percentage clergy in the population. The cases are a mixed lot. There a university-towns among them - towns were the percentage of clergy was necessarily high.

We would attach most value to the evidence from England, the only one that covers extensive non-urban areas. From the 1400s to the 1600s the percentage clergy in the population had increased somewhat. In the meantime reformation had taken place and the clergy was to a large extent married in 1688. As the evidence from the 1400s measures an unmarried clergy against a population with families - it looks as if the clergy at best had kept its numerical strength in the population.

Today it counts for very little numerically - many of its functions being cared for by other professions in the social, educational and health-sector and in the governmental administration.

Table 46 shows percentage nobility in the population. We would normally expect a nobility ranging from 1 - 2 % of population and our expectations seem confirmed. While in some societies all native inhabitant ranked as noble - as was the case in some Basque provinces - other had no recognized legally separated nobility at all. Normally its position as an upper class was occupied by the upper parts of the administrative apparatus, the richest landowners and burghers. Normally they took after the noble way of life while the lack of legal recognition of its status makes it difficult to limit.

In some cases - Poland and Hungary - the percentage noble was very high. Apparently there must here exist a nobility that cannot have departed very much from ordinary European farmers.

Table 46 Percentage of nobility in population.

Period	Area	Percentage	Comment	Source
Late 1400s	Castille	1.14	Total	Hay 1973 p.69
		0.07	Upper nobility	
		0.72	Lower nobility	
		0.34	Rich peasantry	
1436	England	1.67	Total	Hay 1973 p. 69
		0.17	Peers	
		1.5	Gentry	
1688	England	2.80		
		0.12	Lords	
		0.23	Baronets	
		0.14	Knights	
		0.55	Esquires	
		1.75	Gentlemen	
1600s	Poland	10.0	Poland proper	
1800s	China	2.0	Scholar-gentry	Wolf 1973 p.104
1800s	Japan	2.0		Akamatsu 1972
1800s		10.0	South Japan	

Sources: Deane 1969 table 1 (1688), Cambridge vol.5p.559(1600s).

Table 47. Social groups in an early medieval society.

Social group	Type of tombs	Percentage of tombs
Nobility	Rich	1.6
Warriors, functionaries,	Modest	29
free peasants	Knife only	10
Other	No social evidence	c.60

Source: Gieysztor 1970 p. 179

Table 47 presents a case of social stratification from Moravia in the 800s. The site where excavations have taken place was some sort of a Moravian capital. Even so early the size of the different social groups is very close to what we shall find in Europe later in history. The nobility is of normal size, and there is a sort of a middle-class of c. 40 % - resembling the distribution from tables 61 and 65 and not too uncommon to that in table 48.

4.3 Social groups.

The chapter concerned with social groups is mainly based on contemporary evidence. The material ought to be taken for what it is worth.

It has been noticed by some authors (Slicher van Bath 1970 , Deane 1969) that percentage of population engaged in industrial activities might have fallen during the industrial revolution. Obviously - there might have occured - with the introduction of more expensive machinery - more whole-time activity in industry thereby decreasing number of workers engaged while hours apent in industry increased. Besides the artisans and crafts there is a group of labourers presents that might have had connection with industry.

In comparing table 48 and 49 there is one tendency to notice - the increase of the middle-class. The lower classes are almost equally big in the two cases. The farmers are not very differnet in numbers either - what do our comparison easier - nothing would in itself of course be more natural than a differnce in numer of farmers between England and France.

But traders and bourgeoisie seems to have almost doubled between 1688 and 1780. At the same time craftsmen and artisans have disappeared. There is no doubt that craftsmen and artisans still existed in France in 1780,

Table 48 Social groups in England 1688.

Social group	Families in social group		Persons in social group	
	Thousands	Percent of total	Thousands	Percent of total
Nobility	17	1.2	154	2.8
Clergy	10	0.7	52	1.0
Officeholders	10	0.7	70	1.3
Merchants/trade	10	0.7	64	1.2
Law	10	0.7	70	1.3
Liberal arts	16	1.2	80	1.5
Shopkeepers	40	2.9	180	3.3
Military officers	9	0.7	36	0.7
Freeholders, farmers	330	24.2	1730	31.2
Artisans, crafts	60	4.4	240	4.4
Seamen, soldiers	85	6.2	220	4.0
Labourer, servants	364	26.7	1275	23.2
Cottagers, paupers	400	29.4	1300	23.6
Vagrants			30	0.6
Total	1361	100.0	5501	100.0

Source: Deane 1969 table 1.

Table 49 Social groups in France 1780.

Social group	Persons in social group. Percent of total.
Nobility	0.3
Clergy	0.8
Civil, military officers	1.3
Liberal arts, science, law	0.4
Traders, bourgeoisie	16.9
Peasants	28.1
Journeymen, workers	42.4
Servants	8.3
Soldiers	1.5
Total	100.0

Source: Kirsten, Buchholz, Kollmann 1966 p. 23

Table 50 Social groups in Roman Egypt. Village of Aphrodito.

Social group	Persons	
Big farmers	22	
Small farmers	c. 80	
Clergy	12	
Textile-craft	13 - 14	plus wool-weavers
Metal-craft	5	plus coppersmiths
Other crafts	17	plus shoemakers
Trade	6	
Service, administrative	7	
Other occupations	12	
Total	c. 175	

Source: Jones 1964 pp. 848 - 49

but the attitude reflected might be of some importance. The appearance of craftsmen and artisans in history keeps one in doubt whether these were workers or rather entrepreneurs working with paid labour or whether there actually were differences between various crafts and various places. Their income place them in the middle-class in the English society of 1688.

This group is known to have vanished during the industrial revolution though rather in the 1800s than earlier. But it is not important enough to stand out as an own group in France in 1780. Its numerical position has been occupied by the bourgeoisie.

Table 48 pictures the English society of 1688. We do not know whether the difference between labourers and cottagers marks one between mainly industrial and mainly agricultural pursuits. But we are not sure that the industrial population after all was insignificant in England in 1688. In fact an agricultural population of c. 55 % with remaining groups having part-time connection with agriculture does not seem impossible.

The lower classes make up about half the population, a part that is more or less reflected in other modern class division and in division of land in the Middle Ages.

That the middle classes - if we should count these two groups as a middle class at all - make up approximately a third. Also that is partly reflected in medieval division of landed property.

Table 50 shows a division of population on occupations and social groups in Roman Egypt. While not for a moment holding that this was a division that was common in the Roman Empire, neither in Egypt it might be an item for thought that this - probably the most economically developed - province of the Roman Empire had such large segments of craftsmen.

4.4 Occupational groups.

The results in terms of tons and meters coming out from medieval and early modern mining, industry and agriculture might appear insignificant. Nvertheless - as productivity was low so it required many workers in some branches to obtain the material results reported. This is a viewpoint that might stress the importance of some of the industrial sectors - in that sense that a lot of people were dependant on them for their living.

Table 51 shows some cases of labour-force in mining. It is obvious that if the area with which comparison is made is little - so miners must be relatively many. In these cases however - Cartagena has been estimated in percentage of the population-estimate for Roman Spain.

The mines at Laurion reached 10000 slave-workers at the height of its prosperity. The slaves might not have been the whole force either if we take account of industries attached to the mining - as metal-processing. Population of Athens is put at 200000 - what should make a labour-force of 50000 men.

The estimate from Germany must be taken for what it is worth. Mining in early modern Europe - however - needed a lot of input, and we shall not overlook its importance in economy as far as the living of human-beings is concerned.

Table 53 shows labour-force in taxtile-industry. The estimate from Florence comes from Villani. It should be interesting to note that if one considers the output made by Florenting textile-industry this figure is in line with what one might expect. At least if Florence har the same relation between workers and output as England.

The English estimate is made by Postan - based on what is known of time required for the various processes in textile. This was often a matter of quarrel between the various interested parts in the industry. We have compared it with Russell's estimate for the population of England in the 1400s.

Table 51 Labour-force in mining

Period	Area	Labour-force in thousands	Percentage in mining of total labour-force
- 400	Athens	10	20
- 200	Cartagena	40	4
1523	Germany	100	2
1940	Britain		6.1
"	Belgium		5.9
"	Germany		2.1
"	France		1.8
"	Sweden		1.1
"	Austria		0.7

Sources: Woytinski 1953 p. 763 (for 1940), Cambridge vol. 1 , p. (1523),Finley 1968 p. 4 (400 B.C), Finley 1968 p. 8 (200 B:C).

Table 52 Labour-force in fishing

Period	Labour-force in fishing in thousands			Percentage in fishing of total
	World	Europe	Netherland	World
1800	2000			c. 1.0
1900	3000			
1936	4000	626	18	c. 1.0
1950	5000			

Source: Woytinski 1953 pp. 724 - 26.

Table 53 Labour-force in textile-industry. Medieval and

Period	Area	Labour-force in thousands	Percentage of total labour-force
1330	Florence	30	
1400s	England	15 - 20	3 - 4
1953	USA	1060	1.77

Sources: Postan 1972 p. 130 (England 1400s),
Aschehoug Encyclopedia (US textile labour-force), tome 7 p. 51,
Yearbook 1957 p. 322. (US labour-force) ,
Cambridge Economic vol. 2 pp. 394-95 (Florence).

Table 54 Some occupation-groups in the Middle Ages.

Period	Area	Population in thousands	Occupation-group	Percentage of labour-force
1322	Toulouse	30	Butchers	2.4
1330	Frankfurt	10	Butchers	3.6
1330	"		Bakers	4.0
1330	Florence	50	Bakers	1.2
1330	Paris	60	Buildingwork	1.6
1330	Norwich		Masons	0.6

Source: Cambridge Economic vol. 2 , pp. 515-16 (builders).
Pounds 1973 p. 354 (butchers, bakers). Russell 1958 pp. 60,61
on urban population.

Table 54 shows some other occupation-groups. There are surprisingly many bakers, it looks as if it was customary to buy bread. Compared to modern timed the percentage of bakers and butchers have fallen, what was to be expected. There remains to take account of the retailing of these goods in modern society.

Table 55 shows the importance of servants in the Ancient economy. It would be worth to investigate how many were children.

Table 55 Servants in percentage of population.

Period	Area	Percentage	Comment
800s	German villages	3.3	Of population
1449	Nurnberg city	27.2	Of adults
1449	Nurnberg country	14.7	"

Source: Russell 1958 pp. 15, 16.

4.5 Income.

The Middle Ages had conceptions about age and poverty that caused groups to be exempted from the poll-tax.

Table 56 Part of the population considered as paupers.

Period	Area	Percentage paupers	Comments
1294	Carcasonne	35.8	Tax - exempted
1330	Florence	33	
1385	Toulouse	52.1	Tax - exempted
1430	Toulouse	48.4	"
1437	Brussels	10.5	

Source: Russell 1958 pp. 56, 119 (Carcasonne, Toulouse)
Pounds 1973 p. 340 (Florence, Brussels).

4.6 Distribution of landed property.

We treat two aspects concerning the distribution of land. The one is its ownership by four groups of owners - the crown, clergy, nobility and peasants. The other aspect is the distribution within the peasant class itself - which is treated in chapter 4.7.

Table 57 shows the part of land or the part of farms owned by nobility. As a rule the noble property consisted of relatively large farms situated in - for the most part - the better agricultural areas. It resembled in these ways the royal property - that is royal property before the Reformation. The Church-property might have had a somewhat different composition.

These traits characterizing the noble property probably reflects its origin and the use made of it. Aquisition of property was probably easier to perform by transfering large collections of property instead of collecting it by the piece. Such a method necessitated scrutinity in gathering as well as the upkeep. Peasants had a short memory for customs conflicting with their own interests.

Noble property increased probably above all by transference from the Church. In spite of its efforts in medieval clearing and aquisition by piece - a method suited the more efficient administrtion of the Church - it has been doubted that the Church managed to retain its share of land through the medieval. The most went to the nobility - aquired one way or the other.

As the noble property on the average was somewhat larger than that of the Church its share in land might be soemwhat underestimated by a registration of farms. On the other side - the Church had the tithe to rely on.

Even a medieval nobility as powerful as the English did not fully match the Early Modern Scandinavian concerning ownership in land.

Table 6 0 Percentage of cultivated land owned by the crown.

Period	Area	Percentage of soil	Comment
400	Roman	16	City of Cyrrhus
450	Roman	50 or more	Cappadccia
500s	Roman	50	Estimate, Tunisia.
1086	England	17.5	
1300	Norway	4 plus chapters	4% royal chapters
1600	Denmark	25	Of farms
1600s	Sweden	36	Of farms
1700	China	27	

Sources: A.H.M. Jones 1964 pp. 415-16 (Roman)
Schreiner 1953 p. 156 (1086)
Helle 1964 p. 113 (1300)
Cambridge vol. 5 p. 526 (Denmark), pp. 534-35 (Sweden)
Wolf 1973 p. 104

Table 57 Percentage land owned by the nobility.

Period	Area	Percentage	Comment
1600s	Denmark	67	Burghers included
1655	Sweden	67	Of farms
1700	Sweden	33	Of farms
1877	Russia	22	
1917	Russia	11	

Sources: Cambridge vol. 5 p. 526 (Denmark), pp 534-35 (Sweden)
Wolf 1973 p. 65 (Russia).

Table 58 Percentage of cultivated land owned by the Church.

Period	Area	Percentage of soil	Comment
- 1150	Egypt	30	20% of population
1086	England	26.5	
1300	Norway	40	4% royal chapters
1300s,1400s	Catalonia	25 at least	
1300s,1400s	Castille	25 or more	10% military orders
1300s,1400s	Bohemia	33	
1300s,1400s	England	16 - 25	
1500	Lombardy	10	
1500	South Italy	65	
1600	Spain	20	
1700	China	14	

Sources: Müller 1959 p. 30 (Egypt), Schreiner 1953 p. 156 (1086) Helle 1964 p. 113 (Norway), Hay 1973 p. 48 (1300s, 1400s and 1500). Cambridge vol.5 p.128, Wolf 1973p.106.

Table 59 Percentage of cultivated land owned by the peasants.

Period	Area	Percentage of soil	Comment
1086	England	0	
1600s	Denmark	1.7	Of farms
1700	Sweden	31	Of farms
1877	Russia	32	
1917	Russia	47	
1300	Norway	41	

Sources: Schreiner 1953 p. 157 (1086), Helle 1964 p.113 (1300), Cambridge vol.5 p. 526(Denmark), pp. 534-35 (Sweden), Wolf 1973 p. 65 (Russia).

The violent fall in Swedish noble property in the later 1600s reflects the origin this property. In the mid 1600s large parts of the royal property - for a great deal former Church land - were transfered to nobility. Around 1680 the Crown - relying on the less favoured parts of nobility - succeeded in pulling it back.

A main trend characterizing parts of Europe in the 17 - 1900s has been the transference of property from nobility to farmers - often with big agricultural unrest in its wake. As in France before 1789 this transference played a certain role in the Russian revolution.

Table 60 shows land owned by the Crown. There is no certainty how great was imperial land ownership in the Roman Empire, probably it varied between the regions. Cappadocia showed up large imperial demesnes - perhaps going back to Hethite Crown-estates. Similar conditions might be expected to be found elsewhere in the East.

Cyrrhus is a Syrian city. It was the home-town of Avidius Cassius - his confiscated property probably figuring in the table. The Emperor owned 16-18 % of the African provinces in Tunisia for which we have evidence. This is - as far as we can understand - total land area - that should make up approximately half of cultivated land. But also Africa was a stronghold for imperial property - and the average in the Empire was certainly less.

The rest of the table shows the strengthening of the Crown connected with the Reformation. Even in non-Reformed countries property was re-allocated towards the Crown - the old Church property felt too large for its new duties.

Table 58 shows percentage of land owned by the Church. It is commonly held to have been 30 - 40 % and this holds for medieval. It is often high in poop mountainous countries - for instance Norway. Churches apparently managed to exploit small plots of land economically.

Lombardy is reported to have experienced a steady fall in the part of ecclesiastical property in the Late Middle Ages. In the North Reformation took away the position

of the Church. It was transfered rather soon to burghers and nobility in England, in Denmark it was mainly kept in royal hands until 1660, in Sweden - except for the transference to nobility 1650 - 80, until 1720. During the late 1700s and the 1800s it finally fell into the hands of the farmers.

Table 59 show the peasants part of the land. They were legally removed as an owning-class in England after 1066 - a position that did not remain long. Already in the early 1100s there are peasants owning land. Farmers remained with a large part of the land in mountaineous countries like Norway. Also here they were mostly removed from the central agricultural areas - retaining most of their property in outlying districts.

4.7 Distribution of holdings after size.

We shall do a little investigating in the distribution of landed holdings - especially peasants- after size. What is interesting is the social stratification that can be read out of the figures.

In medieval England there might be a tendency - apart from effects from the grouping of material - to a division into three groups. There existed the conception of a hide - a number of acres that made a family self-sufficient. As economic conditions vary between regions so much a hide based on a so functional measure do. It might though show a fluctuation around 120 decare.

The middle-rank peasants might have originated in divided hides. Finally there are small holdings that can hardly have been sufficient for a livelihood.

Slavery was in decline in England 1086 - during the following century the former slaves were to merge with the cottar and bordar class.

According to Postan's calculations - a holding of half a hide or approximately 60 decare should be just enough to "keep body and soul together". This imply that nearly 1/2 of the landed English population could not live

Table 61 Peasants holdings in Russia in the 1800s.

Social group	Percentage of households	Percentage of land
Rich peasants	20	35 - 50
Middle peasants	30	20 - 45
Poor reasants	50	20 - 30

Source: Wolf 1973 pp. 63 - 64.

Table 62 Distribution of holdings after size.

Landowners in Egypt, early 300s.			
Size of holding Decare	Number of landowners	Size of holding Decare	Number of lanowners
Over 666	14		
266-532	6		
80-266	22	128-160	3
26.6- 80	90	32-128	3
Under 26.6	66	Under 32	6

Source: Jones 1964 p. 772

Table 63 Distribution of land in England 1086.

Social group	Number of households in this social group Thousands	Total area cultivated by this group. Million decares
Demesne		4 - 8 or more
Freemen	12	2
Sokemen	23	2
Villeins	108	9
Bordars	82	
Cottars	6 - 7	1

Source: Seebohm 1926 p. 103.

Table 64 Distribution of holdings in England 1086.

Social group	Percentage of population in this group	Size of holding in decare
Free	12	
Villeins	38	120, ranging 60-320
Bordars, cottars	32	20, ranging 4- 40
Slaves	9	"

Source: Lipson 1945 p. 34 - 52

Table 65 Distribution of peasants holdings in medieval England.

Social group	Percentage of population in this group	Size of holdings Decare
Great peasants	22	120 or more
Middle rank	33	40-60, ranging to 120.
Smallholders	45	30 or less

Source: Postan 1972 p. 130. 6400 cases from 104 manors.

from the land they cultivated. Either they must have earned it as agricultural workers or - what provided plenty of opportunities as the Middle Ages wore on - in industry and crafts. (Postan 1972 p. 130 ff., Kellenbenz 1974, see also table 53 with comments.)

There is a tendency that rural population divide in three groups. One of prosperous peasants - those who were able to obtain contracts written on their holdings - thus securing a prominent position in much agricultural history - that sued the landowners and often won their cases that acted as the lord's stewards and often menaged to get away with some of his properties and rights. The backing from this class was a necessity for most rural undertakings, the well-to-do peasant so prominent in many of the rural risings.

There is a middle group - that together with the prosperous forms about half the rural population. And there are the poor - probably with a heavy reliance on their rights in the commons and non-agricultual pursuits. Norwegian evidence might imply that this group were not necessarily serfs - many freeholder in poor districts must have been much worse off than a serf cultivating a well arrondated property on prosperous land.

Table 62 shows evidence from Roman Egypt. It should be remembered that most of Egypt was very fertile agricultural land, a country where items as house and cloth was less necessary than in other parts of the Empire and where prices on agricultural products was lower than in other parts.

Table 63 shows an estimate by Seebohm. The total estimated land might be on the low side - others have wanted it raised to 36 million decare in total. The distribution might - however - be of some interest. Demesne is the part of property retained under the owners own cultivation and not let out to dependent farmers but cultivated by them.

Sokemen is a type of dependant with a very free position relative to the lord. The word points to his right to "soke" - seek the lord for judicial assistance.

Villains denotes the ordinary serf, bordar probably a property situated on the "bord" - the outskirt of

of agricultural land. Cottars refer to "cottage" - housemen, with enough land to exploit the working-capacity of wife and children without providing for the family. This type of agricultural worker is common all over Europe.

Table 61 shows division of classes in the Russian peasant society before the revolution. The variation in the figures refer to the various regions, not to uncertainty in number.

4.8 Poverty.

The number of poor people was always great. Braudel thinks (Braudel 1974) that one quarter of the population lived in constant misery. A part of our material is from tax-exemptions - a mark of people that cannot afford to pay taxes, but not necessarily poor.

It might be concluded that something between 10 % and 25 % of the population in towns were considered paupers.

Table 66 shows the expenditure on poor-relief in England. It was reorganized after the civil wars in the 1600s - partly as an insurance against social unrest. Its operation was left to the local level of administration and its function apparently varied from county to county.

In looking at public expenses one should not overlook the local. As these rates are divided on inhabitants - we ought to multiply with 4 or 5 to get the charge per family. And many families did not pay.

The rates were felt heavy enough to give reason for complaints. It did not give enough for the poor either - especially as their number appears to have grown during the industrial revolution.

4.9 Slavery.

We have picked out two aspects on slavery - the number of slaves in a society and their price. Censuses from earlier ages were mainly preoccupied with that part of the population that was relevant as soldiers or tax-payers. Slaves did normally not belong to this group. The number of slaves in Antiquity is therefore uncertain.

Table 67 - nevertheless - gives a rather consistent picture. We are best informed about Athens - and slave-number is as ucertain as is number of other inhabitants. The estimate might therefore vary somewhat from author to author. We have registrated a possible fall in the percentage of slaves from c. 400 to c. 340. Population fell in the same period, economic conditions might have become less prosperous.

One thing is important to note. We are poorly informed as far as regions is concerned. All our estimates comes from great cities with a specialized economy. It is almost certain that slaves cannot have counted for so much Greece taken as a whole. We might suspect that Korinth had as many as had Athens. There were slave-populations in Thessaly, Sparta and on Crete.

But we might conclude that in towns of the same economic type as Athens - slaves might have counted for 1/3 of population. Social conditions was apparently stable with so many slaves. It might be (see Finley and Jones 1968) that their conditions not fully resembled that of the Roman agricultural slaves or moder European slavery in the colonies. And also the slave-states in USA managed to have as high percentage slaves as had Antiquity.

A minority of Americans owned slaves. Still fewer owned many. It was commonly held in Athens that everybody paying war-tax - that is 40 - 45 % of the population could afford a slave.

Table 66 Expenditure on poor-relief. England 1688 - 1834.

Year	Amount spent. Thousand pounds.	Poor-relief per inhabitant. Shilling.
1688	c. 700	c. 2.5
1701	c. 900	
1714	950	c. 3.5
1760	1250	
1784	2004	c. 5
1803	4078	c. 8.83
1813	6656	c. 12.75
1824	5737	c. 9.17
1834	6317	c. 8.83

Source: Taylor 1969 pp. 106 - 107

Table 67 Slaves in percentage of population.

Period	Area	Percentage	Comments
- 400	Athens	c. 33	
- 400	Greece	(25 - 33)	"Normal"- Xenophon.
- 400	Greece	(33)	Recommended by Plato
- 400	Syracus	20	
- 340	Athens	c. 15	
160	Pergamon	33	
1860	USA.	33	Only slave-states

Sources: Finley 1968 p. 58 , 88.
Fowler 1963 p. 213, (Pergamon)

Table 68 Prices on slaves.

Period	Area	Price. Converted to denarii.	Comment
- 414/413	Athens	640	Average
- 400	"	500 - 600	Average
		960--1200	Skilled
		500	Miners
		800--1000	Agricultural
- 329/326	"	600	Unskilled
- 350	Athens	1200 -2400	Cutlars
- 340	Greece	1200 -1600	Standard
- 216	Italy	600	War-prisoners
- 150	Roman	205	Child
	Roman	200	Miner
+ 150	Roman	500 - 600	Average unskilled
500s	Byzans	300	Average
550	"	150	Child under 10
		300	Unskilled
		450	Skilled
	Byzans	650	Clerk
		ducats	
1500/1550	Sicily	30	Galley-men
1550/1600	Sicily	60	Galley-men

Sources: Jones 1968 p. 5, Tarn/Griffith 1966 p. 229, Finley 1968 p. 13, Jones 1964 p. 852, Braudel 1974 p. 32.

Table 69 shows the development of slave-prices. The original sources has its prices reported in drachmae and solidi besides denarii. We have converted drachmae to denarii after the rate of

the solidus after the rate of 1 solidus to the (un-inflated) denar.

But this provides no real key to slave-prices, we would want to see them in connection with parameters as subsistence-payment or an "ordinary" payment. What made people survive is - after all - a constant factor through history.

We might suggest that 120 drachmae was the upkeep for a slave, 180 would be sufficient, if not decent - for subsistence of a free worker.

360 drachmae might keep a family in life, and a skilled worker might claim 540 drachmae a year.

These four figures would make

In the first century before zero 60 denarii might count as a subsistence-rate - that at least was paid to the soldiers. A landworker - possibly with family - might claim 300 denarii.

About 2.5 to 3.5 solidi counted for upkeep of a slave - that is approximately 40 to 50 denarii. 10 solidi was the rations of soldiers - that make 150 denarii.

Finally - in the late 1500s - 10 ducats would perhaps count for subsistence and 30 for a humble living. Skilled worker in high-cost urban areas like Venice could no doubt claim 100 - 200 ducats.

Slaves appears to have been cheapest in Athens.

5 PRODUCTION.

5.1 Introduction to production.

From the mining-sector we receive time-series of some quality. The sector is one of the utmost importance. Many workers was engaged in mining - and its indirect influence on the countryside through delivery of food, charcoal and timber was important. Finally it was an important sector from a fiscal point of view. The connection between the iron- and coal-sector and the industrial revolution needs no underlining.

But data from mining are limited geographically. We might have to proceed to some sort of estimating the figures we want.

One thing is important to note. In our figures the industrial revolution comes as no bolt from the blue. On the contrary it is prepared through centuries of slow increase in production. It was not only the shortage of fuel that might have strained English iron-industry. On the market-side we see a mounting demand for English iron-ware.

5.2 Agriculture.

This all-important sector derserves thorugh treatment. In this paper we will only present one aspect: the ratio between seed and yield. On fields where unusual circumstances were present - as great natural fertility or abundant manure - yield could be high in relation to seed. The normal was 3:1, and continued to be so for long after the 1500s in many countries in Europe. The ratio tells us little about return per man or per acre - dense sowing and high return per acre might have been the normal.

Table 69 Ratio between seed and yield.

Period	Area	Ratio	Comment
Roman	Italy	4	
Roman	Egypt	10	
- 1200	France	3.0	
1300-1499	France	4.3	
1200- 49	England	3.7	
1250- 99	England	4.7	
1300- 49	England	4.2	
1350- 99	England	5.2	
1400- 49	England	4.6	
1200- 99	England	3.8	Wheat only
1300- 99	England	3.8	"
1400- 99	England	4.6	"
1504- 37	England	6.6	"
1500-1699	England	7.0	
1550- 99	England	7.3	
1600- 49	England	6.5	
1500-1699	Germany	4.2	Included Scandinavia
1550- 99	Germany	4.4	"
1700- 49	Germany	3.8	"
1700-1820	Germany	6.4	"
1550- 99	East Europe	4.5	
1650- 99	East Europe	3.9	
1550-1820	East Europe	4.1	
1812	Netherlands	8.0	Wheat
1812	Netherlands	12.5	Barley and oats

Source: Slicher van Bath 1970

But it reminds us that a big part of production every year had to be drawn away for investment the following year. An increase from a ratio 3 to one of 4 would let the rate of investment drop from 33% to 25% of production.

5.3 Manufacturing:

On one hand manufacture - like agricultural products - depends to a large degree on the number of inhabitants. Like eating - a minimum of cloting and housing must have been provided for and they probably form up a considerable amount of the total production of manufacture and building. The registrations for textile-production come mainly from export. They were a sort of luxury and semi-luxury. This is a vital sector in textile, but only a sector. Further - it is of interest not only the production, but the spreading of the manufacture, how well the clothing was - that is cloth in relation to population number. The table for English exports of wool-cloth shows a marked progress from the medieval to 1815-19. Relative to population in England the production for export is six times as large at the latter moment. That means though - as productivity certainly rose - that manufacture must have been important in medieval british economy.

From the figures of weight which are not given in the table it looks as if the average weight of each piece was reduced from the Middle Ages to the 1800s.

British cloth was apparently exported from early. The manufacture that developed in the High Middle Ages were probably somewhat restricted in their expansion by the wool-export - to foreign markets where prices were higher. After the Black Death a surplus of wool might have occured and from 1350 the expansion of textile industry in England takes place. The greatest periods of growth were the late 1300s and the early 1500s. The gap between 1622 and 1815 ought to be covered. If consumption of wool is any clue - it rose from 20000 ton c.1700 to 56000 ton c.1815.

Table 70 Manufacture of cloth.

Period	Cloth-export from England Thousand pieces	
300	Export mentioned	
800	Export mentioned	
1350	0.7	
1354-55	10.6	
1356-58	15.6	
1360-61	9.5	
1370	13	
1382	20	
1390	30	
1392	40	
1402	50	
1470	40	
1480	62	
1500	46	London only.
1525	75	"
1542-44	99	"
1545-47	118.6	"
1550	132.8	"
1550-52	110.1	"
1598-00	103	"
1614	127	"
1618	102.3	
1622	75.6	"
1815-19	1450	Thousand pieces
1815-19	7550	Thousand metres
1938	290000	Thousand metres
1950	264000	Thousand metres

Sources: Bautier 1971 p.212, 240 (1350-1480), Cambridge vol. 4 p. 40

5.4 Mining.
Production of coal.

The production of coal is an indicator of the amount of energy employed by man. It is however - only one of the competing sources. When studying the rise of its production in England one has to have in mind the increasing population and the decreasing use of wood and peat for heating.

Coal is employed in economy as a producer of heat/energy and as a chemical agent - for instance in the conversion of iron ore to iron. After 1800 new uses were developed. Wood/charcoal and peat are alternatives for domestic heating and baths, charcoal in industrial processes where termal energy is needed - among them in the production of glass, metal-ware, brick, pottery, and in production of salt, tar and other evaporating processes. Up to c. 1600 also the mining-industry relied on fuel - mainly charcoal. Compared to coal - the higher purity of charcoal makes it more easily adaptable to industry. It also carries relatively low cost of transport in relation to energy-content.

Roman mining of coal might have taken great proportions (Collingwood 1936). In Roman Britain the army had its biggest concentrations in an area with easy access to coal - found in legionary camps.

The demand for peat and wood was very great. Concern for forests could not help needs to outpace resources. In many parts of Western Europe coal is present at the surface. Mining seems to have occured in many places from about 1150.

Many coalfields in England and those of Liege, Westfalia and Southern France were opened in the Middle Ages. Coal was more important as fuel in Paris around 1300 if the number of grocers dealing with it is any clue. Coal came to Paris from Liege over the Rhine and Rouen. To London it came from Newcastle. In the Calais-area those two competed. Given favourable communication coal could accordingly carry the costs of long transportation.

In the 1500s the Newcastle-area has 1/4 of the production in Britain. The production in 1380 is estimated of the assumption that the relation was the same then.

Domestic heating probably was the most important use of coal. Proper coking was not introduced. Domestic fire-places then turned into great sources of pollution. Coal was the fuel of poor-folk. This fact, and the high degree of pollution reached in London in the late 1200s led the Parliament to introduce the debate on pollution. Coal-heating was prohibited, without result. The metal-industry, the black-smiths of England protested. This proves the importance of coal also in the processing of metal.

Apparently coal was to some degree applied in the making of iron. The same polluting properties that smoked the air of medieval cities made it - however - difficult to apply. It might have disappeared with the introduction of the high-ovens in the 1400s, whose high heating-chambers made it vulnerable to choking by coal-dust.

The increase c. 1500 and c. 1600 is notable. The production at Liege probably multiplied 3 - 4 times in the decades after 1477. (Nef 1952 p. 473 in Cambr. Econ. Hist.). This coincides with the general increase in mining in Central Europe in that period. Also the increase in the English production around 1600 is remarkable, in percentage as rapid as any later period. In the next century artificial waterways were introduced from the Continent to market it.

A new use of coal came with the introduction of a steam-engine, that could transform the coal to mechanical energy. Late Roman use of steam-power was impressive.

But it took the way of creating artificial earth-quakes for military purposes. It had to compete with water-power that attracted industrial interest and provided it with mechanical energy in the form of rapid revolving movement unlike the slow Roman door-openers.

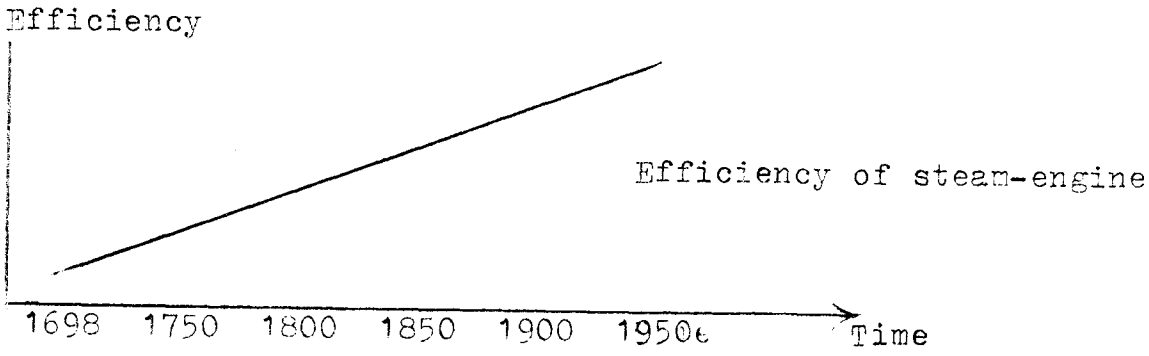
Table 71 Production of coal in Europe.

Period	England	Belgium	Germany	France	Europe
			Million tons		
+ 150/350	Mined				
1150	Mined	Mined	Mined	Mined	
1380	0.03				
1500	0.1	0.2			0.3-0.4
1551-60	0.2				
1591-92	0.4				
1600	0.7	0.3			1.0
1608-09	0.9				
1609	1.0				
1633-34	1.8				
1660	2.1				
1681-90	2.9	0.4	0.1		3.5
1700	2.6				
1750	4.8				
1770	6.2				
1781-90	10.1				World
1800	11.0				
1820	17.4				
1830	24.0		1		30
1850	35		4		
1870-74	123		42		251
1900-04	230		157		827
1950	220		202		1493

Source: Darby 1936 p.259 (1380),
Mc Evedy 1972b p. 38 (1500, Belgium 1600),
Cambridge vol. 4 p. 98,

About 1650 new devices were invented. Energy from torsion in steel - like watches, but powerful enough to move a car, explosion-engines based on powder outlined by Huygens. His assistant - Papin - finally drew the attention to steam. The further development is like figure 2.

Figure 2. Development of steam-engine.



Source: Cipolla 1960 p. 61

The earliest steam-engines were economically enough in mining, to keep out the water. The improvements made by Watt led to its introduction in textile and to the possibilities for making stem-boat, steam-bus, steam-railway. Water-power in the same period developed higher efficiency too, and was re-introduced from 1840, and later in the form of electricity.

Figure 2 pictures the "invention" of the steam-engine. It would be hard to assign any particular date to the invention. It looks like a process where steps are passed on which the steam-engine proves efficient enough to be applied to new industries.

Production of iron.

There was important development in metal-processing in the late middle ages. The high production reached by Spain (e.g. Navarre and the Basque provinces) is due to improvements leading forward to tha high-ovens of the 1400s. The height and increased use of water-power to bellows, thereby increasing temperature meant falling prices for iron. Probably it required purer materials and led to increased reliance on charcoal. This probably eased the development in founding of metal which characterized the period - the ultimate successful development of artillery being the most conspicuous result. Related to metal-making progress is further printing. At the end of this period occured a great increase in mining. It might be that production in most of Europe by the early 1500s reached the niveau it was to have until late 1700s. New sources were developed. In the 1600s in Sweden, in the 1700s in Russia.

There is a general tendency to an increase in mining 3 - 4 times around 1500, an increase we see reflected in the table in the Austrian production. The further increase is slow - especially when the coming of Sweden and Russia is taken into consideration.

Production of the iron-cannon meant substituting price for quality and weight. The cheap iron-cannon were accordingly best suited where weight did not matter so much - on sea and for coastal defence. The needs of the Netherlands are related to the expansion in Sweden in the 1600s. (Cipolla 1970.).

While the Netherlands relied on Sweden the stagnating production of raw iron caused anxiety in England. At least from 1598 the government sought to diminish the dependence on foreign iron by developing new processes based on coal. From the 1620s the first coal-based iron appeared, probably for processes where inferior quality did not matter. (

Table 72 Production of iron in Europe.

Thousand tons

Period	Europe	England		Austria	Belgium	Sweden	Russia
c.1300				2			
c.1460				2			
c.1500	125					1	
c.1540				8			
c.1600	150	18				5.5	
c.1620						6.7	
c.1640						10.6	
c.1650		20				17.3	
c.1660						16	
c.1700							0.01
c.1715	200	18				27	
c.1720						28	
c.1740		12-15					80
c.1770		20	20	20	20		125
c.1800	400	125					163
1820	1650						164
1840	3300						
1860	7360	3827	898		320	205	296
1880	18500	7900					

Million tons

1900	41	9	
1920	60	9	
1950	134	8	

Sources: - ..), Cambridge Economic Vol. 2 p.439 (Austria), McEvedy 1972b p. 38 (Europe 1500-1715), Lipson 1945 p.160 (England 1715-40) Cambridge Vol. 4 p.97 Woytinski 1953 p 785, 1117. (1770 and after)

Table 73 English consumption of raw iron.

Thousand tons

Period	European production	English production	consumption
1660	150 - 200	c. 20	c. 12
1751-55	c. 200	below 20	c. 48
1761-65	c. 200	below 20	c. 61

Source: Woytinski 1953 p. 1100

Table 74 Production of steel.

Year	Steel produced. Million tons.	Pig iron produced.
1850	-	5
1870	1	13
1900	29	40
1920	72	60
1940	142	102
1960	380	260

Source: Cipolla 1970 p. 71

It is evident from table 73 that while the English production of raw iron stagnated, processing of iron expanded, parly to an export-industry of great importance. The great leap forward in English production in the late 1700s has its origin in this development that created a big domestic market ready to absorb the iron supplied.

After 1750 the production of iron from coal had reached a stage where demand multiplied. Apparently it was above all created a new market. Not so much did it compete with the charcoal-iron as the new and cheap iron went into uses where metal had never been applied. By and large the market for quality-iron also increased. But the new techniques proved to have great potetialities for development, and from 1856 the Bessemer-process pointed to the possibilities of making steel from cheap iron. Within two decades this happened.

Production of tin, lead and copper.

There exists relatively continuous datas for the production of tin in England. The country has mines not only in Cornwall, but also in Devon and the North. The Cornish mines were opened in the Bronze Age but not continuously mined after then. From 1150 we can - however - follow its development.

The main impression is the relatively stable niveau up to the industrial revolution. The increase in European mining so predominant around 1500 did not apply to the British tin mines apparently. There are variation in production, with a peak reached just before the Black Death.

The industrial revolution was accompanied by a marked increase also in tin production. With increasing competition from mines with lower costs in the East Asia area the British production fell.

Table 75 Production of tin. Main producers.

Period	Production in England Thousand tons	World production Thousand tons
1150	0.07	
1200	0.35	
1301	0.33	
1303	0.47	
1338	1.00	
1355	0.27	
1379	0.49	
1400	0.87	
1625-40	0.5	
1700-09	1.4	
1720-29	1.5	
1740-49	1.7	
1760-69	2.7	
1780-89	3.0	
1800-09	2.6	
1820-29	4.3	
1850-59	6.4	
1860-69	9.0	
1880-89	9.2	
1900-09	4.5	
1913	5	136
1929	3	199
1950	1	164

Sources: Cambridge Economic vol.2 p.439
Darby 1936 p.259 (1301-03, 1355-1400).

Woytinski 1953 p.801f. (1900-50).

Table 76 Production of lead.

Period	Production in thousand tons			Comment
	England.	Poland.	World	
1500		0.15		
1600		1.0		
1625-40	12			Production
1650		2.5		
1700-09	11.9			Export
1720-29	10.2	Spain		"
1740-49	12.6			"
1760-69	15.6			"
1780-89	14.9			"
1800-09	15- 16			Production
1820-29	11.8			Export
1840-49	54.4			Production
1860-69	68.0			
1880-89	42.8			
1900-09	21.3			
1913	18	182	1228	
1929	19	127	1684	
1939	17	29	1650	
1950	3	36	1500	

Sources: Cambridge vol.4 p.399

Woytinski 1953 p.801f. (1913-50)

Table 7.7 Production of copper.

Period	Production in thousand tons		
	England	Sweden	World
- 1000			0.1
1650		2.9	
1780-89	4.0		
1800-09	6.0		
1913		5	1006
1929		1	1951
1939		10	2200
1950		16	2250

Source: Pounds 1973 p.84 (-1000).
Woytinski 1953 p.797 (1900-50).

The development of the production of lead tells much the same story. Poland is included to give a vague impression on what level lay the metal-production of that age. The production in England never rose significantly compared to population. The country was a major producer of metal in Europe, with an important export. It is therefore not a quite right comparison to do - to compare England of those ages with the world to-day. The world of 1950 had a consumption on 1/2 kg lead per man per year - in addition to that recovered from scrap. We consume 3/4 kg copper in addition to scrap and 1/20 kg tin each. Compared to this there were relatively rich supply of metal at the disposal in earlier periods.

In England in the middle ages 1/4 kg was mined per man per year. The consumption must have been less as there was an export. If Bohemia and Spain - the two other main producers matched the production of England, the supply in Europe would have been as high as c. 1/30 per man per year. In addition there is the scrap, as when bells were taken down to be melted into cannons.

Likewhise the English production of copper and lead must have been able to carry a consumption which - in relation to population - was as big as in the world today. Compared to this the growth in consumption of iron and coal has been bigger. England produced c. 4 kg per man in 1600, and consumed c. 10 kg in the mid- 1700s. Compared to this the world consumed three times as much per man in 1950. In the same period iron and steel replaced timber for many constructing purposes.

As for coal some 15 kg may have been produced per man per year in England in the late 1300s. It was doubled in 1500. At 50 million inhabitants in Europe there was only 6 kg consumed on this basis. In England it was far more: 100 kg in the 1590s and 200 kg about 1610. This rate of increase has never been matched. About 1700 it reached 1/2 ton and 1 ton in 1750. It was at the same rate in 1800, per man the coal-consumption did not increase during the industrial revolution.

The world consumed 1/2 ton of coal in 1950. The total consumption of enegy - however - was at the equivalent of about 1 ton. The world had accordingly yet not more resources at its disposal - although they were certainly better used in terms of energy developed per ton of fuel.

5.5 Production of energy.

There was one water-mill per c. 200 inhabitants in England 1086, probably with a few kW each. At 2 - 3 kW per mill they were capable of producing some 100 MWh, but was hardly used more than a little part of the year apart from the hazards of water-supply. This makes a theoretical maximum of 100 kWh against 1 MWh per man per year in 1860, and ten times as much around 1950.

In 1086 water-mills were only a part of the total picture, where animal labour and men played a major part. But even so early mechanical-power was not absent and its development proceeded rapidly in the following centuries. The first occupations to be mechanized were milling of corn and sawing of stone. Very important was the adaption of water-power to processing of cloth from the 900s to the 1100s. Adaption of water-power in weaving - however - was undertaken in silk-industry only. (1200s).

Table 78 Production of energy.

Year	Coal	Lignite	Petroleum	Nature gas	Waterpower	Total
			Million tons			
1860	132	6	-		6	1078
1880	314	23	4		11	2623
1900	701	72	21	7	16	6089
1920	1193	158	100	24	64	11298
1940	1363	319	299	82	193	15882
1960	1809	874	1073	469	689	33475
			Million MWh			
1860	1057	15	-			
1880	2511	58	43			
1900	5606	179	213	75		
1920	9540	394	1046	254		
1940	10904	798	3120	867		
1960	14472	2184	11159	4971		

Source: Cipolla 1970 p. 55

Table 79 Commercial energy consumed per head.

Year	Population Milliards	Energy Milliards MWh	Ratio
1860	1.3	1.1	1
1900	1.6	6.1	4
1930	2	13.1	6
1960	3	33.5	11

Source: Cipolla 1970 p. 56

6 GOVERNMENT AND FINANCE.

6.1 Introduction to government and finance.

The aim of this chapter is to provide a grid that will aid in the valuation of numerical evidence. The task will not proceed very far in this paper - only lay the first foundation for late work. There is an immense amount of scattered evidence relating to governments business, like taxes, customs. We wish to win from them some information about the society in which they originated.

There is first the problem of finding a common denomiator over time where currency is involved. There are slid reasons to rely on subsistence-quotas, that is to measure in some sort of "man-year". That will line up the sums as so and so many men - according to the wage-rate present. By investing his time in labour-saving devices man has increased his capacity to perform some sort of work - transport being the most obvious case. Especially this will carry weight if the modern period is in question. Still - in line with what we have argued earlier - the capacity of seting men in motion is important enough to defend some comparison on this basis.

In the first turn we will have to rely on gold denomination. The buying-power of bullion has changed. It was high in Roman period and in the 1800s, lower in Athens in Antiquity, in the 1500s and today - when, at least in Europe much gold is needed to buy a man-year.

Less obvious is the term "subsistence". But it would certainly be too ambitious to attempt at any solution other than the simple one. A.H.M. Jones has analyzed the economy of Athens, Fernand Braudel that of the Mediterranean, both concerned with distant years. And they still both contribute a well suited background to historical reading.

6.2 Government income and expenditure.

The table shows the incomes of a number of European central governments. It is not - a necessity to underline - showing the public expenditure or income. In many countries local taxation and expenditure was important and the variations between countries great. Any comparison between countries has to take this into consideration.

This does not imply that a survey of state-expendiutre is without interest. Many kinds of political action - for instance those connected with foreign policy - was the priviledge of the central government. Action in this field was undertaken mainly within and with regard to the limits imposed by state budget.

All currency has been converted to Venetian ducats. The ultimate interest for the government is with men, material, services, properties and rights. And money is converted into these objects on rates varying with year and geography. The buying power of money was certainly lower in 1600 than in 1483. In the 1500s and 1600s its buyingpower was lowest in Spain, highest in Poland - by and large it fell from the north-east towards the south-west where the main kinds of money - bullion - entered the European economy.

Some of the states registeres in the table are unified under one ruler. The incomes at the disposal of the Spanish and Austrian rulers are far bigger than those originating from their own realm in some of the years.

In 1483 we note the remarkable positon of Egypt. The once so yielding Roman and Byzantine province produced something about one ducat per head - far more than the European societies. The relation between France and Castille did alter within long. In less than fifty years the resources of the latter was added to those of Burgundy, Naples, Milan and Aragon besides areas not mentioned in the table. That made the Empire of Charles the fifth the equal of France and more. And this was in a period when resources from the Americas extended the Imperial means still more. The Ottoman Empire absorbed Egypt in 1517 and then commanded far more money than any European state.

Table 80 Income of European governments.

	Income in million Venetian ducats. (3.5 gr gold).			
Year	1483	1600	1715	1815
State				
Ottoman	4	4	2.73	2 - 4
Egypt	4			
France	2.75	5.5	14.7	67.2
Castille	1.3	9.8	3.36	7.35
Aragon	0.5	0.6		
Sicily		0.6		
Portugal	0.3	2	2.73	2 - 4
Naples	0.3	3	1.3	7.35
Milan	0.3	1.5	1.3	
Belgium			1.3	
Burgundy	0.5			
Netherland		1.1	5.25	12.6
Venice	0.9	2	2.73	
Papacy	0.3		2.73	2 - 4
England	0.3	0.9	11.55	147
Savoy		0.5	1.3	
Austria		0.5	5.25	21
Poland		0.5		
Preussia			2.52	14.7
Bavaria				2 - 4
Wurtemberg				2 - 4
Saxony				2 - 4
Denmark				2 - 4
Sweden		0.2		2 - 4
Russia			3.36	21
U.S.A.				8.4

Source: Mc Evedy 1972 b pp. 3, 24, 38, 40, 58.

Compared to the northern economies the buying power was - however - far lower in the Mediterranean.

In 1600 the resources of the Spanish Empire goes to 17.6 million ducats in the areas mentioned in the table, if the Netherlands are included in total. This dwarfs the incomes of other European states. We note the rapid increase in money-income in many Mediterranean economies, in a period with increases in prices. The Ottoman Empire - that experiences price-rise as well - might show signs of a deterioration in economiy. This was a crisis that in the early 1600s was to envelop many Mediterranean areas.

In 1715 Spain had lost its dependencies. They now lay within the Austrian sphere of influence - Portugal and Netherland had broken loose. The relation between France, England or Austria and Netherland is approximately 3 : 2 : 1.

In 1815 the relation between England and France are cast about. It is worth noting that in relation to other nations than England France has kept its leading position, having 3 to 4 times the income of Preussia, Russia or Austria.

6.3 Armed forces.

In the city-states in Antiquity the armed forces were the entire adult male population roughly 1 out of 4 inhabitants. So were conditions among the Celtic and Germanic tribes. The principle was never forgotten - but retained in the french arriere-ban and the norse allhusing ("all houses"). Supplementary levies to other types of armies were occasionally called up. Slaves were never considered fit for service in Antiquity - except as professionals. So the nobility in Europe did not like to see their serfs armed. So it existed a mixture of paid, professional armies, feudal armies and conscipted militias. The armies are accordingly not always clearly limited bodies, neither always apt for numerical

Table 81 Percentage of population in armed forces.

Period	Area	Armen forces in thousands	Population in millions	Percent
c. 300	Roman	350	c.50	0.7
c. 400	Roman	650	c.50	1.4
1600s	France	180	c.25	0.7
1600s	"	150	19	0.8
1832	"	350	32.5	1.0
1962	"	415	46.5	0.9

Sources: Mc Evedy 1972b p. 5, Jones 1964 pp. 59-60, pp.679-80.

Table 82 Size of armed forces.

Period	Area	Number of soldiers in thousands	Comment
- 31	Roman	420	At 6000 in each legion
+ 14	"	168	
117	"	180	
138	"	168	
180	"	180	
207	"	204	
305	"	402	
312	West	286	
395	Roman	645	
565	Byzans	150	Excluded frontier defence
1632	Sweden	175	
1632	Russia	35	
1680	Russia	129	
1680	France	350 or more	
1683	Ottoman	500	150000 in transport
1688	Preussia	30	

Sources: Cambridge Vol.5 pp. 176, 513, 552, 577, Jones 1964 p.20, pp. 679 ff.

key element in Roman economy by its very size. So it does not seem too unlikely that the increase in wages and number of soldiers under the Severians, combined with reducing the metal content of the denar can have caused the monetary crisis of the 200s with the rapid inflation. As the result was falling real wages of the soldiers a major sector in Roman economy lost much of its buying power. Other sectors might have won as the soldiers lost, but they were apparently not able to catch up the falling demand of the soldiers by increasing their own.

This presupposes that urban and craft-sectors, that showed decline - were dependent upon denar-economy and not on types of self-sufficiency or other non-bullion types of exchange-economy like the cowrie exchange economy.

Likewise - by its size - and the big amounts of money sunk in wages and equipment - the armed forces was an important economic sector in Early Modern Europe.

Under Diocletian the Roman army probably not far from quadrupled. The army proper consisted of about 200 000, there was a frontier defence and a navy numbering not far from 50 000 men. The 1600s brought armies up on the same level. When french armies in 1680 reached about 350 000 they were based on a population of about 20 million inhabitants - far less than the Roman Empire. The first armies of this size probably are the Swedish of Gustavus 2. and the Spanish army. In the east the Ottoman inheritors of Byzans kept an army of bigger size but with transport-corps and a large number of technical and siege experts.

6. 4 Interest on capital.

As a medium of exchange money is probably a very old phenomenom. There are three types: 1) an object with value as a usable item can appear as money. This shades into trade in kind. 2) gold - silver 3) symbolical money - commonly paper today ; where the central fact is the government assurance that the owner shall have value according to the denomination on the note - or at least public acceptance of this as a fact.

This might go for gold and silver as well. In fact these items seem able to retain their value without assurance of any kind due to their restricted supply. The nominal value of coins can be interfered with.

Any kind of object can appear as money - stamps, match-boxes, chewing-gum and tobacco reportedly being most common in countries with lack of money of other kind - for small denominations that is.

Table 83 shows the development of the rate of interest. In the late 1600s and early 1700s rate of interest in Europe went down to 3 - 4%, the lowest rate ever recorded. That the market-rate should have been as low as 6 - 7 % after 200 B.C. is worth noting. But nothing seems to imply that the world of Antiquity was in lack of bullion to take care of their economic transactions. In terms of bullion the prices in Athens were high - much gold and silver was needed to buy goods. It was scarcer in Early Modern Europe.

Table 83 Rate of interest from - 400s to the Present.

Period	Area	Rate of interest	Comment	Source
-400s	Athens	12	Legal	Tarn/Griffith 1966
-400s	Rome	12	Legal	p. 133
-330	Delos	12	Commercial,	
-300	"	10	market rate.	
-200s	"	8.33 - 10	"	
-200 -	"	6.66 - 7	"	
-150	"		Culminating - 146.	
- 85	"	12	"	
- 50	"	12 - 48	"	
530	Byzans	6	Legal	Levy 1967 p. 95
530	"	8	Trade	
530	"	12	Maritime	
1400s	Florence	7 - 15		Hay 1973 p.376
1649	Netherland	5		Cambridge Vol.5
1655	"	4		p. 33
1672	"	3.75		"
1664	Amsterdam	3		"
1670	England	Over 8		"

7 STATES AND RELIGIOUS AFFILIATION THROUGH EUROPEAN HISTORY:

7.1 Introduction to this chapter.

The trends in Western Civilization Program is concerned with differences between our civilization and others. One striking difference between Europe and China is the much greater fragmentation in the West. While the Roman Empire did not manage to survive in Europe, Chinese and East asian history is dominated by empires centered somewhere within China.

Borders between states count in history. Economic, social and ideological forces are modified by their existence and location. Our task in the first part of chapter 7 is to identify the states and determine their number.

We will not here try to define or in some way give any description of a state. But it has always been a hierarchy of political units - and we will have to make a distinction between them. There might be a fairly common agreement to-day but it requires special knowledge to determine how things were in Germany 200 years ago. As for the Antiquity and the Middle Ages we have to make a distinction between a state and a more primitive form for political organization. No one will deny the character of a state as far as the Roman Empire is concerned. Certainly the tribes outside the Empire contributed to the fragmentation of Europe. But they do not fall into our conception of Western Civilization.

There is much that can be said in favour of a demarcation based on religion. (1) The adoption of Christianity meant introduction of many new techniques in government. One can argue that the religious conversion meant establishment of a new type of government far more than a new religion. S 2

Table 84 Number of states in European history.

Year	Number of states	Year	Number of states
138	1	1212	27
362	1	1230	26
406	5	1278	29
420	10	1360	28
450	8	1401	26
476	13	1430	25
528	9	1478	22
562	8	1483	33
600	9	1520	25
626	14	1559	25
650	18	1600	24
737	22	1634	22
771	20	1648	23
830	17	1701	23
888	27	1750	23
923	27	1797	23
998	17	1803	26
1028	28	1812	22
1071	37	1815	24
1092	31	1830	27
1130	23	1871	16
1173	22	1900	17
		1913	19

Source: Mc Evedy 1964, 1972a, 1972b.

comparison.

All armies probably have some sort of technical staffs. The heavy greek infantry brought servants in the field. So also the feudal armies relied on private servants in the field. The main trend in the last centuries has been that the army itself is supplied with separate corps for transport, medical service, food and so on. This was by no means unknown in Antiquity and in the Middle Ages but mainly neglected in the European armies growing out of feudal levies.

It goes without saying that separate corps for various services of this kind can swell the numerical size of an army compared to one that lack these. This can probably account for some big numbers during history. So the Ottoman army employed transport-corps on the frontier where supply was difficult while the Austrians relied on private firms not counted in the army. If sieges and bridging of rivers has to be undertaken the technical staff can swell.

We have compared the percentage of the population in the Roman period and Early modern Europe. The reason for this is that they refer to the same part of the world, we know relatively much about them and they are the same type of armies. Both the Roman and the Early modern armies were mainly composed of paid professionals. It would be more difficult to compare with a feudal army.

We see that roughly the army during the Dominate was of the same size as that of the 1600s. It is further of the same size as the yearly conscripted today.

The size of the Roman armies underwent big variation over time. We see the increase under Traian and the following decrease as the Empire went on the defensive. It was increased under Marcus and the Severians. The army was now big and the soldiers relatively well paid. The defence budget must have constituted a

The fiscal and military development arising from the Anglo-French wars played a role in giving birth to absolutism. (Anderson 1975). The fragmentation and wish to survive as sovvereign units spread the new system of government. The "contest between equals" pushed the military development forward. In China and Japan it was also so, only to be halted during the Ming and Tokugawa peace. (Elvin 1973).

After the dissolution of the Roman Empire Christianity was introduced in Germany (600, 800), Scandinavia and East Europe (1000). From then on these areas are counted as states. The last area to be converted - the Baltic-area - did not give rise to states proper. This leads to an expansion in number as new states are drawn into the european orbit. The fight between the roman successors is easy to trace. The Byzantine and Merovingian attacks lead to a reduction.

After 1028 the stability in number is the predominant trait. There is a break in the methods of counting in 1483, therefore a reduction around 1500. The effect of nationalism give a reduction c. 1870 and an increase c. 1920.

Religious affiliation is a table constructed in a somewhat complicated way. The datas from 1483 and later are collected from Mc Evedy. For earlier years we rely as far as population is concerned on our earlier compilations in this series. (Trends in Western Civilization Programme: Longitudinal tendencies I).

As we regard the Christian religion as intimately related to westernness we include all areas under Christian rule within the former Roman Empire. As areas pass over to Muslim domination the area will contract through the early periods.

Table 85 Religious affiliation in Europe.

Period	Adherents in millions: Catholic	Protestant	Orthodox	Muslim	Arian
400		42			
528	5		26		11
800	14		10	4	
1000	19		15	7	
1200	38		15	2	
1340	59		10	0.3	
1483	61		13.5	2.5	
1600	56.5	17.5	16.5	2	
1715	75.3	18.5	22.5	3	
1815	115	37.75	51	4	

	Percentage distribution Catholic	Protestant	Orthodox	Muslim	Total
1483	80.3		16.4	3.3	100.0
1600	61.1	18.9	17.8	2.2	100.0
1715	63.0	15.5	18.9	2.5	99.9
1815	55.3	18.3	24.5	1.9	100.0

Source: Mc Evedy 1972 b. pp. 23, 37, 57, 87. See text.

(2) The conversion to Christianity introduces a vital element in Western Civilization. (3) The period when Christianity is introduced is one of centralization and comes out with a relatively clear number of political unit with some similarity in character.

There is the problem of the petty units. In a way they do not contribute very much to a political fragmentation. It is the medium-sized units of some political weight that give Europe its distinct character. Luckily - the problem has been posed to others also. We have based our counting on the historical maps of Colin Mc Evedy. As we have excluded the tribes outside the Roman Empire the problem of the lower units in the hierarchy is first posed in connection with the feudalism. These new units certainly contributed to fragmentation. We have nevertheless chosen to follow Mc Evedy, disregarding all except cases like Normandy, early medieval Bavaria, late medieval Burgundy. From 1483 the bigger territorial units in Germany is counted as political unit. In the gradual disintegration of the Empire it is difficult to fix any date for the emancipation of the German principalities. The same goes for Italy.

The last demarcation is that of the Western Civilization. For arbitrary reason the Western border of the U.S.S.R. is the limit in the table. Any state having possessions within this area is counted.

Then to the variation in number. The Roman Empire broke up - its Western Part that is. Perhaps less so in contemporary minds. Bede still wondered what would be left for mankind if the Empire was lost. Certainly the Empire is a term rich in meanings. Perhaps the idea of a common heritage weakened - never entirely to wane. The Carolingian prided themselves as defenders of Europe, so did the Saxon Emperors until 1025. The idea re-occured just before 1300, now as the United States of Europe. At the same time the idea of the souvereign state was given a new birth.

c. 400: The population of the Roman Empire counted and regarded as being under Christian rule.

c. 528: Population figures from 400. Only France under Catholic rule, the rest of the west Arian.

c. 800: Muslim rule in the Iberian peninsula. Italy predominantly orthodox as Bysanz controlled the most populous part.

c. 1000: Besides Spain is a part of Italy under Muslim rule. North Africa and Egypt are removed from the survey already 800. Syria was lost in 800 when only Asia Minor appear in the table, but was partly recovered in the year 1000 and appear in the table.

Syria, Asia Minor, South-East Europe and a part of the Italian population is regarded orthodox. Catholic religion expands to the north and east. East Europe and Scandinavia is included.

c. 1200: Muslim Europe restricted to southern Spain with a guess for population. Asia Minor, South-East Europe and Russia orthodox. Byzans still keep the most populous part of Asia Minor under control. The same is held for 1340.

Of course the numbers are not too reliable. We can so far take no account for religious oppsition in one form or another. Further the ecclesiastical system went through many alterations through the period considered. In the main it is a story of integration up to c. 1100, of disintegration in the later Middle Ages.

If we take at look at the influence of the different religions - we see orthodox religion retract with the waning territory of the byzantine empire and expands with the rise of Russia. 1/5 - 1/6 of all christians went to protestants as far as control of territory is concerned. It must be mentioned that Germany is split on the two groups of religions - other states are not.

Catholic religion in the Middle Ages could take advantage of the new territories in the north and north-east and the rising population in Europe. Its relative weight in number declined - besides there were - and are - strong minorities within Catholic territory.

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