

HUMAN GEOGRAPHY

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Subject: HUMAN GEOGRAPHY

SYLLABUS

Nature and Scope of Human Geography

Growth and Development of Human Geography, Age of Human vs. Physical Debate, Determinism and Possiblism

Evolution and Race of Man

Chemical Evolution, Theory of Spontaneous Generation, Biological Evolution, Life Cycle, Adaptation Age of Fossils Determined, Various Model of Human Evolution, Human Race and Classification

Trends and Patterns of World Population

Growth of World Populations, Cultural Factors that Affected Population Growth, Major Tribes of World Regional Division of Population on the Basis of Growth Rate, Demographic Transition, Theories of Migration

Economic Activities

Food Gathering and Hunting, Secondary Activities, Tertiary Activities

Human Settlement

Origin of Settlements, Stage of Development, Pattern of Rural Settlement, Urban Settlement

Suggested Reading

- 1. James M. Rubenstein, The Cultural Landscape: An Introduction to Human Geography, Prentice Hall
- H.J. de Blij, Alexander B. Murphy, Erin H. Fouberg, Human Geography: People, Place, and Culture, John Wiley & Sons
- 3. William Norton, Human Geography, Oxford University Press
- Jerome D. Fellmann, Mark D. Bjelland, Arthur Getis, Judith Getis, Human Geography: Landscapes of Human Activities, Brown & Benchmark

Chapter1- Population: Its Nature and Perspective

Learning Objectives

- To define the Population.
- To explain the Geographical Scrutiny of Population.
- To explain the Population Growth and Decline.
- To describe the Population Movement.

1.1 Population

A population is a summation of all the organisms of the same group or species, which live in the same region, and have the capability of interbreeding. In ecology, the population of a certain species in a certain region is estimated using the Lincoln Index. The region used to define a sexual inhabitants is defined as that within which interbreeding is potentially possible between any pair within the region. The likelihood of interbreeding is greater than the likelihood of crossbreeding with individuals from other regions. Under normal circumstances, breeding is substantially more common within the region than across the border.

In sociology, population refers to a collection of human beings. Demography is a social science that entails the statistical study of human populations.

1.1.1 Population genetics

In population genetics, a sexual population is a set of organisms in which any pair of members can breed together. This means that they can regularly exchange gametes to produce normally fertile offspring, and such a breeding group is known therefore as a gamodeme. This also implies that all members belong to the same species, such as humans. If the gamodeme is very large (theoretically, approaching infinity), and all gene alleles are uniformly distributed by the gametes within it, the gamodeme is said to be panmictic. Under this state, allele (gamete) frequencies can be converted to genotype (zygote) frequencies by expanding an appropriate quadratic equation, as shown by Sir Ronald Fisher in his establishment of quantitative genetics. Unfortunately, this seldom occurs in nature : localization of gamete exchange through dispersal limitations, or preferential mating, or cataclysm, or other cause – may lead to small actual gamodemes which exchange gametes reasonably uniformly within themselves, but are virtually separated from their neighboring gamodemes. However, there may be low frequencies of exchange with these neighbors. This may be viewed as the breaking up of a large sexual population (panmictic) into smaller overlapping sexual populations. This failure of panmixia leads to two important changes in overall population structure: (1). the component gamodemes vary (through gamete sampling) in their allele frequencies when compared with each other and with the theoretical panmictic original (this is known as *dispersion*, and its details can be estimated using expansion of an appropriate binomial equation); and (2). the level of homozygosity rises in the entire collection of gamodemes. The overall rise in homozygosity is quantified by the *inbreeding coefficient* (f or φ). Note that *all homozygotes* are increased in frequency – both the deleterious and the desirable! The mean phenotype of the gamodemes collection is lower than that of the panmictic "original" - which is known as inbreeding depression. It is most important to note, however, that some dispersion lines will be superior to the panmictic original,

while some will be about the same, and some will be inferior. The probabilities of each can be estimated from those binomial equations. In plant and animal breeding, procedures have been developed which deliberately utilize the effects of dispersion (such as line breeding, pure-line breeding, back-crossing). It can be shown that *dispersion-assisted selection* leads to the greatest *genetic advance* (ΔG = change in the phenotypic mean), and is much more powerful than selection acting without attendant dispersion. This is so for both allogamous (random fertilization) and autogamous (self-fertilization) gamodemes

1.1.2 World human population

As of today's date, the world population is estimated by the United States Census Bureau to be 7.121 billion. The US Census Bureau estimates the 7 billion number was surpassed on 12 March 2012. According to a separate estimate by the United Nations, Earth's population exceeded seven billion in October 2011, a milestone that offers unprecedented challenges and opportunities to all of humanity, according to UNFPA, the United Nations Population Fund.

According to papers published by the United States Census Bureau, the world population hit 6.5 billion on 24 February 2006. The United Nations Population Fund designated 12 October 1999 as the approximate day on which world population reached 6 billion. This was about 12 years after world population reached 5 billion in 1987, and 6 years after world population reached 5.5 billion in 1993. The population of countries such as Nigeria is not even known to the nearest million, so there is a considerable margin of error in such estimates.

Researcher Carl Haub calculated that probably more than 100 billion people have been born during the last 2000 years.

1.1.3 Predicted growth and decline

Population increased significantly as the Industrial Revolution gathered pace from 1700 onwards. The last 50 years have seen a yet more rapid increase in the rate of population growth due to medical advances and substantial increases in farm productivity, particularly beginning in the 1960s, made by the Green Revolution. In 2007 the United Nations Population Division projected that the world's population will likely surpass 10 billion in 2055.

In the future, the world's population is expected to peak, after which it will decline due to economic reasons, health concerns, land exhaustion and environmental hazards. According to one report, it is very likely that the world's population will stop growing before the end of the 21st century. Further, population will actually decline some likelihood before 2100. The population has already declined in the last decade or two in Eastern Europe, the Baltics and in the Commonwealth of Independent States.

The population pattern of less-developed regions of the world in recent years has been marked by gradually declining birth rates. These followed an earlier sharp reduction in death rates. This transition from high birth and death rates to low birth and death rates is often referred to as the Population transition.

Control

Population control is the practice of artificially altering the rate of growth of a human population. Historically, human population control has been implemented by limiting the population's birth rate, usually by government mandate, and has been undertaken as a response to factors including high or increasing levels of poverty, environmental concerns, religious reasons, and overpopulation. While population control can involve measures that improve people's lives by giving them greater control of their reproduction, many programs have exposed them to exploitation.

Worldwide, the population control movement was active throughout the 1960s and 1970s, driving many reproductive health and family planning programs. In the 1980s, tension grew between population control advocates and women's health activists who advanced women's reproductive rights as part of a human rights-based approach. Growing opposition to the narrow population control focus led to a significant change in population control policies in the early 1990s.

1.2 Geographical Scrutiny of Population

Population scrutiny includes the sets of methods that allow us to measure the dimensions and dynamics of populations. These methods have primarily been developed to study human populations, but are extended to a variety of regions where researchers want to know how populations of social actors can change across time through processes of birth, death, and movement . In the context of human biological populations, Population scrutiny uses administrative records to develop an independent estimate of the population. Population scrutiny estimates are often considered a reliable standard for judging the accuracy of the census information gathered at any time. In the labor force, Population scrutiny is used to estimate the sizes and flows of populations of workers; in population ecology the focus is on the birth, death and movement of firms and institutional forms. Population scrutiny is used in a wide variety of contexts. For example, it is often used in business plans, to describe the population connected to the geographic location of the business. Population scrutiny is usually abbreviated as DA. For the 2010 U.S. Census, The U.S. Census Bureau has expanded its DA categories. Also as part of the 2010 U.S. Census, the DA now also includes comparative scrutiny between independent housing estimates, and census address lists at different key time points.

1.2.1 Introduction

Demography is the statistical and mathematical study of the size, composition, and spatial distribution of human populations and how these features change over time. Data are obtained from a census of the population and from registries: records of events like birth, deaths, movements, marriages, divorces, diseases, and employment. To do this, there needs to be an understanding of how they are calculated and the questions they answer which are included in these four ideas: population change, standardization of population numbers, the Population bookkeeping equation, and population composition.

1.2.2 Population Change

Population change is analyzed by measuring the change between one population size to another. Global population continues to rise, which makes population change an essential component to Populations. This is calculated by taking one population size minus the population size in an earlier census. The best way of measuring population change is using the intercensal percentage change. The intercensal percentage change is the absolute change in population between the censuses divided by the population size in the earlier census. Next, multiply this a hundredfold to receive a percentage. When this statistic is achieved, the population growth between two or more nations that differ in size, can be accurately measured and examined.

1.2.3 Standardization

For there to be a significant comparison, numbers must be altered to the size of the population that is under study. For example, the fertility rate is calculated as the ratio of the number of births to women of childbearing age to the total number of women in this age range. If these adjustments were not made, we would not know if a nation with a higher rate of births or deaths has a population with more women of childbearing age or more births per eligible woman.

Within the category of standardization, there are two major approaches: direct standardization and indirect standardization.

1.2.4 Direct Standardization

Direct standardization is able to be used when the population being studied is large enough for agespecific rate is stable.

1.2.5 Indirect Standardization

Indirect standardization is used when a population is small enough that the number of events (births, deaths, etc.) are also small. In this case, methods must be used to produce a standardized mortality rate (SMR) or standardized incidence rate (SIR). </ref>

1.2.6 Population Bookkeeping (or balancing) equation

Population bookkeeping is used in the identification of four main components of population growth during any given time interval.

The Population bookkeeping equation is as follows:

$$P_2 = P_1 + (B - D) + (M_i - M_o)$$

The four components being studied by this equation are Population Growth (P_1, P_2) , Births (B), Deaths (D), and In (M_i) and Out (M_o) Movement.

Meaning, the population at any time is equal to the earlier population plus the excess of births over deaths in the time, plus the amount of in-movement minus the amount of out-movement .

1.2.7 Population Composition

Population composition is the description of the population defined by characteristics such as age, race, sex or marital status. These descriptions can be necessary for understanding the social dynamics of historical and comparative research. This data is often compared using a population pyramid.

Population composition is also a very important part of historical research. Information ranging back hundreds of years is not always worthwhile, because the numbers of people for which data are available may not provide the information that is important (such as population size). Lack of information on the original data-collection procedures may prevent accurate evaluation of data quality.

1.2.8 Population Scrutiny in Institutions and Organizations

1.2.8.1 Labor market

The Population scrutiny of labor markets can be used to show slow population growth, population aging, and the increased importance of movement. The U.S. Census Bureau will project that in the next 100 years, the United States will face some dramatic Population changes. The population is expected to grow more slowly and age more rapidly than ever before and the nation will become a nation of immigrants. This influx is projected to rise over the next century as new immigrants and their children will account for over half the U.S. population. These Population shifts could ignite major adjustments in the economy, more specifically, in labor markets.

1.2.8.2 Turnover and in internal labor markets

Public decide to exit organizations for many reasons, such as, better jobs, dissatisfaction, and concerns within the family. The causes of turnover can be split into two separate factors, one linked with the culture of the organization, and the other relating to all other factors. People who do not fully accept a culture might leave voluntarily. Or, some individuals might leave because they fail to fit in and fail to change within a particular organization.

1.2.8.3 Population ecology of organizations

A basic definition of population ecology is a study of the distribution and abundance of organisms. As it relates to organizations and demography, organizations go through various liabilities to their continued survival. Hospitals, like all other large and complex organizations are impacted on the environment they work in. For example, a study was done on the closure of acute care hospitals in Florida between a particular time. The study examined effect size, age, and niche density of these particular hospitals. A population theory says that organizational outcomes are mostly determined by environmental factors. Among several factors of the theory, there are four that apply to the hospital closure example: size, age, the density of niches in which organizations operate, and density of niches in which organizations are established.

1.2.8.4 Business Organizations

Problems in which demographers may be called upon to assist business organizations are when determining the best prospective location in a region of a branch store or service outlet, predicting the demand for a new product, and to analyze certain dynamics of a company's workforce. Choosing a new location for a branch of a bank, choosing the region in which to start a new supermarket, consulting a bank loan officer that a particular location would be a beneficial site to start a car wash, and determining what shopping region would be best to buy and be redeveloped in metropolis region are types of problems in which demographers can be called upon.

Standardization is a useful Population technique used in the scrutiny of a business. It can be used as an interpretive and analytic tool for the comparison of different markets.

1.2.8.5 NGO

These organizations have interests about the number and characteristics of their clients so they can maximize the sale of their products, their outlook on their influence, or the ends of their power, services, and beneficial works.

1.3 Population Growth and Decline Over Time

1.3.1 Population Growth

Population has grown very slowly for most of its existence on earth. Scientists presently estimate that modern human beings evolved roughly 130,000 to 160,000 years ago. Many threats, from diseases to climate change, kept life expectancy short and death rates higher in pre-industrial society, so it took until 1804 for the human population to reach one billion. From that point forward, however, population growth accelerated very quickly.

 Table 1. World population milestones. Source: United Nations Secretariat, Department of Economic and Social Affairs, The World At Six Billion (1999),

World population reached: Year	Time to add 1 billion
1 billion 1804	
2 billion 1927 123 ye	ears
3 billion 1960 33 yea	ars
4 billion 1974 14 yea	ars
5 billion 1987 13 yea	ars
6 billion 1999 12 yea	ars

Through the early decades of the Industrial Revolution, life expectancies were low in Western Europe and the United States. Thousands of people died from infectious diseases such as typhoid and cholera, which spread rapidly in the crowded, filthy circumstances that were common in early factory towns and major cities, or were weakened by poor nourishment. But from about 1850 through 1950, a cascade of health and safety advances radically improved living circumstances in industrialized nations. Major milestones included:

- Improving urban sanitation and waste removal;
- Improving the quality of the water supply and expanding access to it;
- Forming public health boards to detect illnesses and quarantine the sick;
- Researching causes and means of transmission of infectious diseases;
- Developing vaccines and antibiotics;
- Adopting workplace safety laws and limits on child labor; and
- Promoting nourishment through steps such as fortifying milk, breads, and cereals with vitamins.

By the mid-20th century, most industrialized nations had passed through the demographic transition. As health technologies were transferred to developing nations, many of these countries entered the mortality transition and their population swelled. The world's population growth rate peaked in the late 1960s at just over 2 percent per year (2.5 percent in developing countries).

Demographers presently project that Earth's population will reach just over nine billion by 2050, with virtually all growth occurring in developing countries. Future fertility trends will strongly affect the

course of population growth. This estimate assumes that fertility will decline from 2.6 children per woman in 2005 to slightly over 2 children per woman in 2050. If the rate falls more sharply, to 1.5 children per woman, world population would be 7.7 billion in 2050, whereas a slower decline to 2.5 children per woman would increase the world population to 10.6 billion by 2050.



World Population

World population

Many people interpret forecasts like this to mean that population growth is out of control. In fact, as noted above, world population growth rates peaked in the late 1960s and have declined sharply in the past four decades. The world's total population is still rising because of population momentum stemming from large increases that occurred in developing countries in the 1950s and early 1960s. But fertility rates are falling as many developing countries pass through the demographic transition, thanks to factors that include lower infant mortality rates; expanding rights, education, and labor market opportunities for women; and increased access to family planning services.



Population growth rate

World population growth in the 21st century will be different from previous decades in several important ways. First, humans are living longer and having fewer children, so there will be more older people (age 60 and above) than very young people (age zero to four). Second, nearly all population growth will take place in urban regions. Third, fertility rates will continue to decline (footnote 8).

All of these trends will affect nations' economic development. Senior citizens can be active and productive members of society, but they have many unique needs in regions ranging from medical care to housing and transportation. A growing elderly populations will strain social services, especially in countries that do not have well-developed social safety nets to guarantee adequate incomes for older citizens. In countries that have "Pay As You Go" social security programs, increasing ratios of older to younger people may create budget imbalances because fewer workers are paying funds into the system to support growing numbers of retirees.

As societies age, demand for younger workers will increase, drawing more people into the labor force and attracting immigrants in search of work. Declining fertility rates allow more women to work outside of the home, which increases the labor supply and may further accelerate the demographic transition.

As fertility rates fall, some countries have already dropped below replacement level—the number of children per woman that keeps population levels constant when births and deaths are considered together over time (assuming no net movement). Replacement-level fertility requires a total fertility rate of about 2.1 to offset the fact that some children will die before they reach adulthood and have their own families (in a society with higher mortality rates, replacement-level fertility would require more births) (footnote

9). Total fertility rates in most European and some Asian and Caribbean countries presently range from about 1.2 to 1.8, well below replacement level.

Some observers argue that declining fertility rates in both industrialized and developing countries will lead to a "birth dearth," with shrinking populations draining national savings and reducing tax revenues. However, societies can transition successfully from high mortality and fertility to low mortality and fertility with sound planning. Promoting good health standards (especially for children), expanding education, carefully opening up to international trade, and supporting older citizens through retirement are all policies that can help to offset the negative impacts on society of an aging population

1.3.2 Population decline

Population decline can refer to the decline in population of any organism.. It is a term usually used to describe any great reduction in a human population. It can be used to refer to long-term demographic trends, as in urban decay or rural flight, but it is also commonly employed to describe large reductions in population due to violence, disease, or other catastrophes.

1.3.2.1 Definition

Known as **depopulation**, Population decline is the reduction over time in a region's population. The decline can be caused by several factors including sub-replacement fertility (along with limited movement), heavy movement , disease, famine, and war. History is replete with examples of large scale depopulations. Many wars, for example, have been accompanied by significant depopulations. Before the 20th century, depopulation was mostly observed due to disease, starvation and/or movement . The Black Death in Europe, the arrival of Old World diseases to the Americas, the tsetse fly invasion of the Waterberg Massif in South Africa, and the Great Irish Famine all caused sizable depopulations. In modern times, the AIDS epidemic caused declines in the population of some African countries. Less frequently, depopulations are caused by genocide or mass execution; for example, in the 1970s, the population of Cambodia declined because of wide-scale executions by the Khmer Rouge.

Sometimes the term **underpopulation** is applied to a specific economic system. It does not refer to carrying capability, and is not a term in opposition to overpopulation, which deals with the total possible population that can be sustained by available food, water, sanitation and other infrastructure. "Underpopulation" is usually defined as a state in which a country's population has declined too much to support its current economic system. Thus the term has nothing to do with the biological aspects of carrying capacity , but is an economic term employed to imply that the transfer payment schemes of some developed countries might fail once the depopulations to a certain point. An example would be if retirees were supported through a social security system which does not invest savings, and then a large movement movement occurred. In this case, the younger generation may not be able to support the older generation.

1.3.2.2 Changing trends

Today, movement, sub-replacement fertility and high death rates in the former Soviet Union and its former allies are the principal reasons for that region's depopulation. However, governments can influence the speed of the decline, including measures to halt, slow or suspend decline. Such measures include probirth policies and subsidies, media influence, movement, bolstering health care and laws aimed at reducing death rates. Such is the case in Russia, Armenia, and many Western European nations who have used movement and other policies to suspend or slow depopulation. Therefore although the long term

trend may be for greater depopulation, short term trends may slow the decline or even reverse it, creating seemingly conflicting statistical data. A great example of changing trends occurring over a century is Ireland.

1.3.2.3 Statistical misreadings

Statistical data, especially comparing only two sets of figures, can show an incorrect population trend. A nation's population could be increased, but a one-off event could have resulted in the decline and vice-versa. Nations can acquire territory or lose territory and people, consider people citizens they previously denied citizenship to, e.g. stateless persons, indigenous people, and undocumented immigrants or long stay foreign residents. Political instability can render a region within a nation's count unreliable for comparison.

A common misreading is due to timing. Populations on the verge of decline could rise in summer and decline in winter as deaths increase in winter in cold regions, similarly, census dates over too long a time range could show a rise when a country has already tipped into decline. Therefore, numerous sets of statistics should be interpreted to get an idea of a trend.

1.3.2.4 Decline by nation or territory

A number of nations today, stretching from North Asia (Japan) through Eastern Europe, Kazakhstan, Ukraine, Belarus, Moldova, Estonia, Latvia, Lithuania, Bulgaria, Georgia, Armenia, and into Central and Western Europe, including Bosnia, Croatia, Slovenia, Germany, Hungary, and now Italy now face long term depopulation. Countries rapidly approaching long term depopulations (but presently still growing, albeit slowly) include Greece, Spain, Cuba, Uruguay, Denmark, Finland, Portugal, Austria and Lesotho.

Many nations in Western Europe (and the EU as a whole) today would have declining populations if it were not for international movement. The total population of the *continent* of Europe (including Russia and other non-EU countries) already peaked around the year 2000 and as of 2004 is falling.

AIDS had played a mild some role in temporary depopulation; however, at the time, data available suggests that, even with high AIDS mortality, fertility rates in Africa are sufficiently high, so that overpopulation trends continue. AIDS has contributed to a population explosion in Africa as money from fertility reduction programs was redirected into the HIV/AIDS crisis; African fertility rates have actually increased in the past two decades while population grew by over 50%.

1.3.2.5 Long term population decline

A long-term depopulation is typically caused by sub-replacement fertility, coupled with a net movement rate that fails to compensate the excess of deaths over births. A long-term decline is accompanied by population aging and creates an increase in the ratio of retirees to workers and children. When a sub-replacement fertility rate remains constant, depopulation accelerates over the long term, short term often creates flip-flops of trends. No nation in the world has a net population loss since 1950, though Bulgaria has increased the least at less than 1%, and half of all nations have more than quadrupled their populations.

1.3.2.5.1 Japan

Though Japan's population has been predicted to decline for years, and its monthly and even annual estimates have shown a decline in the past, the 2010 census result figure was slightly higher, at just above 128 million, than the 2005 census. Its population has yet to register a decline between census periods. Factors implicated in the higher figures were more Japanese returnees than expected as well as changes to the methodology of data collection. The final population estimate as of April 2013 is 127,354,000, or a return to 2004 levels. The gender ratio is increasingly skewed, some 106 women per 100 men live in Japan. The total population is still 53% above 1950 levels.

1.3.2.5.2 Eastern Europe and former Soviet republics

Population is falling due to health factors and low replacement, as well as movement of ethnic Russians in Russia. Exceptions to this rule are in those ex-Soviet states which have a Muslim majority (Uzbekistan, Turkmenistan, Tajikistan, Kyrgyzstan, Azerbaijan) as high birth rates are traditional. Much of Eastern Europe has lost population due to movement in Western Europe. In Eastern Europe and Russia, mortality fell abruptly after the end of the Soviet Union, and death rates generally rose. Together these nations occupy over 8,000,000 square miles (21,000,000 km²) and are home to over 400 million people (less than six percent of the world population), but if current trends continue, more of the developed world and some of the developing world could join this trend.

1.3.2.5.3 Albania

Albania's population in 1989 recorded 3,182,417 people, the largest for any census. Since then, its depopulation to 2,831,741 in the October 2011 census figures. This represents a decrease of 12.4% in total population since the peak census figure.

1.3.2.5.4 Armenia

Armenia's population peaked at 3,604,000 in 1991 and declined to 3,018,854 in the October 2011 Census. This represents a 16.2% decrease in total population since the peak census figure.

1.3.2.5.5 Belarus

Belarus' population peaked at 10,151,806 in 1989 Census, and declined to 9,457,500 in July 1, 2012. This represents a 7.3% decline since the peak census figure.

1.3.2.5.6 Bulgaria

Bulgaria's depopulation from a peak of 9,009,018 in 1989 and since 2001, has lost yet another 600,000 people, according to 2011 census preliminary figures to no more than 7.3 million. This represents a 23.4% decrease in total population since the peak, and a -0.82% annual rate in the last 10 years. Bulgaria is the country with the smallest population growth since 1950, at 0.5%.

1.3.2.5.7 Croatia

Croatia's depopulation from 4,784,265 in 1991 to 4,456,096 (by the old statistical method) of which 4,284,889 are permanent residents (by new statistical method), in 2011, a decline of 8% (11,5% by the

new definition of permanent residency in 2011 census). The main reasons for the decline since 1991 are: low birth rates, movement and War in Croatia. From 2001 and 2011 main reason for the drop in population is due to a difference in definition of permanent residency used in census' till 2001 (census' of 1948, 1953, 1961, 1971, 1981, 1991 and 2001) and the one used in 2011.

1.3.2.5.8 Latvia

When Latvia splits from the Soviet Union, it had a population of 2,666,567, which was close to its peak population. The latest census recorded a population of 2,067,887 in 2011. This represents a 22.5% decline since the peak census figure. The decline is caused by both a negative population growth rate and a negative net movement rate.

1.3.2.5.9 Lithuania

When Lithuania split from the Soviet Union, it had a population of 3.7 million, which was close to its peak population. The latest census recorded a population of 3.05 million in 2011, down from 3.4 million in 2001., further falling to 2,988,000 in September 1, 2012. This represents a 23.8% decline since the peak census figure, and some 13.7% since 2001.

1.3.2.5.10 Ukraine

Ukraine census in 1989 resulted in 51,452,034 people, the closest known data to the peak, however this number has plummeted to 45,464,917 as of Aug 1, 2013. This represents a 13.1% decrease in total population since the peak census figure, but 23.8% above the 1950 population. Its absolute total decline (5,987,000) since its peak population is the highest of all nations, larger than even Russia.

1.3.2.5.11 Greece

Greece's latest census reported its population fell to 10,815,137 in 2011 from 10,934,097 in 2001 census.

1.3.2.5.12 Hungary

Hungary's population peaked in 1980 at 10,709,000, far earlier than its Soviet cousins, and has continued its decline to under 10 million as of August 2010. This represents a decline of 7.1% since its peak, however, compared to neighbors situated to the East, the rate has been far more modest, averaging -0.23% a year over the period.

1.3.2.5.13 Romania

Romania's 1992 census showed 22,810,035 people, by the October 2011 census it had recorded 20,121,641 people.

1.3.2.5.14 Serbia

Serbia recorded a peak census population of 7,576,837 in 1991, falling to 7,120,666 in the latest October 2011 census. That represents a decline of 6.4% since its peak census figure.

1.3.2.6 Halted Declines

1.3.2.6.1 Russia

Russia's total population is among the largest drops in numbers (but not in percentage). Its peak was 148,689,000 in 1991, while it dropped to 142,737,196 in 2008. This represents a 4.0% decrease in total population since the peak census figure. Still, the Russian government estimates an increase in the population to 143,347,059 in 2012. This recent trend can be attributed to a lower death rate, higher birth rate, and continued movement. It is some 40% above the 1950 population.

1.3.2.6.2 Germany

Germany has encountered depopulation and increase off and on for decades. The German population was expected to decline in 2012, but increased due to movement . The nation's population at 2012 end was 82.0 million, up by 200,000. This represents almost 20% increase over 1950, the lowest among OECD nations.

1.3.2.6.3 Ireland

In the current region of the Republic of Ireland, the population has fluctuated dramatically. The population of Ireland was 6.53 million in 1851, but it dropped due to the Irish famine. The population of the Irish Republic was less than 3 million in the 1930s, but it then rose and in 2011 it was 4.58 million.

1.3.2.7 Declines within race or ethnicity

Some large and even majority groups within a population have shown an overall decline in numbers while the total population increases. Such is the case in California, where the Non-Hispanic Whites depopulation from 15.8 million to 14.95 million, meanwhile the total population increased from 33 million to over 37 million from 2000 to 2010 censuses. In Western Europe, the population of people of local origins has been in absolute decline for a number of years while total populations have shown increases.

1.3.2.8 Economic consequences

The effects of a declining population can be adverse for an economy which has borrowed extensively for repayment by younger generations. Economically declining populations are thought to lead to deflation, which has a number of effects. However, Russia, whose economy has been rapidly growing (8.1% in 2007) even as its population is shrinking, presently has high *inflation* (12% as of late 2007). For an agricultural or mining economy the average standard of living in a declining population, at least in terms of material possessions, will tend to rise as the amount of land and resources per person will be higher.

But for many industrial economies, the opposite might be true as those economies often thrive on mortgaging the future by way of debt and retirement transfer payments that originally assumed rising tax revenues from a continually expanding population base (i.e. there would be fewer taxpayers in a declining population). However, the standard of living does not necessarily correlate with quality of life, which may increase as the depopulations due to presumably reduced pollution and consumption of natural resources, and the decline of social pressures and overutilization of resources that can be linked to overpopulation. There may also be reduced pressure on infrastructure, education, and other services as well.

The period immediately after the Black Death, for instance, was one of great prosperity, as people had inheritances from many different family members. However, that situation was not comparable, as it did not have a continually declining population, but rather a sudden shock, followed by population increase. Predictions of the *net* economic (and other) effects from a slow and continuous depopulation (e.g. due to low fertility rates) are mainly theoretical since such a phenomenon is a relatively new and unprecedented one.

A declining population due to low fertility rates will also be accompanied by population ageing which can contribute problems for a society. This can adversely affect the quality of life for the young as an increased social and economic pressure in the sense that they have to increase per-capita output in order to support an infrastructure with costly, intensive care for the oldest among their population. The focus shifts away from the planning of future families and therefore further degrades the rate of procreation. The decade-long economic malaise of Japan and Germany in the 1990s and early 2000s is often linked to these demographic problems, though there were also several other causes. The worst case scenario is a situation where the population falls too low a level to support a current social welfare economic system, which is more likely to occur with a rapid decline than with a more gradual one.

The economies of both Japan and Germany both went into recovery around the time their populations just began to decline (2003–2006). In other words, both the total and per capita GDP in both countries grew more rapidly after 2005 than before. Russia's economy also began to grow rapidly from 1999 onward, even though its population has been shrinking since 1992-93 (the decline is now decelerating). In addition, many Eastern European countries have been experiencing similar effects to Russia. Such renewed growth calls into question the conventional wisdom that economic growth requires population growth, or that economic growth is impossible during a depopulation. However, it may be argued that this renewed growth is *in spite of* depopulation rather than because of it, and economic growth in these countries would potentially be greater if they were not undergoing such demographic decline. For example, Russia has become quite wealthy selling fossil fuels such as oil, which are now high-priced, and in addition, its economy has expanded from a very low nadir due to the economic crisis of the late 1990s. And although Japan and Germany have recovered somewhat from having been in a deflationary recession and stagnation, respectively, for the past decade, their recoveries seem to have been quite tepid. Both countries fell in the global recession of 2008-2009, but are now recovering once again, being among the first countries to recover.

In a country with a declining population, the growth of GDP per capita is higher than the growth of GDP. For example, Japan has a higher growth per capita than the United States, even though the US GDP growth is higher than Japan's. Even when GDP growth is zero or negative, the GDP growth per capita can still be positive (by definition) if the population is shrinking faster than the GDP.

A declining population (regardless of the cause) can also create a labor shortage, which can have a number of positive and negative effects. While some labor-intensive sectors of the economy may be hurt if the shortage is severe enough, others may adequately compensate by increased outsourcing and/or automation. Initially, the labor participation rates (which are low in many countries) can also be increased to temporarily reduce or delay the shortage. On the positive side, such a shortage increases the demand for labor, which can potentially result in a reduced unemployment rate as well as higher wages. Conversely, a high population means labor is in plentiful supply, which usually means wages will be lower. This is seen in countries like China and India.

A smaller national population can also have Geo-strategic effects, but the correlation between population and power is a tenuous one. Technology and resources often play more significant roles.

1.3.2.9 National efforts to reverse declining populations

Russian President Vladimir Putin directed Parliament to adopt a 10-year program to stop the sharp decline in Russia's population, principally by offering financial incentives and subsidies to encourage women to have children. Australia presently offers a \$5,000 bonus for every baby plus additional fortnightly payments, a free immunization scheme and recently proposed to pay all child care costs for women who want to work. Many European countries, including France, Italy, Germany and Poland, have offered some combination of bonuses and monthly payments to families. Some Japanese localities, facing significant population loss, are offering economic incentives. Yamatsuri, a town of 7,000 just north of Tokyo, offers parents \$4,600 for the birth of a child and \$460 a year for 10 years. The Republic of Singapore has similar plans: \$3,000 for the first child, \$9,000 in cash and savings for the second; and up to \$18,000 each for the third and fourth. The effectiveness of these policies is presently the subject of debate.

Paid maternity and paternity leave policies can also be used as an incentive. Sweden built up an extensive welfare state from the 1930s and onward, partly as a consequence of the debate following Crisis in the Population Question, published in 1934. Today, Sweden has generous parental leave where parents are entitled to share 16 months paid leave per child, the cost divided between both employer and State.

1.3.2.10 Alternative idea relative to skills

Sometimes the idea of depopulation is applied where there has been considerable ex-movement of skilled professionals. In such a case, the government may have ceased to reward or value certain skills (e.g. science, medicine and engineering), and sectors of the economy such as health care and technology may go into decline. Such characterizations have been made in Italy, Bulgaria and Russia in the period starting about 1990.

1.4 Population Movement

Population Movement or Movement, long predates the drawing of today's national boundaries: in parts of Africa and Asia population movements still conform to old patterns rather than modern political geography. Yet the estimated more than 125 million people presently living outside the countries of their birth, including refugees and undocumented migrants, represent just over 2 per cent of the world's population. More significant in modern times is the movement of people from rural to urban regions.

1.4 .1 Internal Movement

The world is steadily becoming more urban, as people move to cities and towns in search of employment, educational opportunities and higher standards of living. Some are driven away from the land that, for whatever reason, can no longer support them. By the year 2005, urban regions are expected to be home to more than half of the world's people.

Already 74 per cent of Latin American and Caribbean populations live in urban regions, as do 73 per cent of people in Europe, and more than 75 per cent of people in Australia, Canada, New Zealand and the United States. In both Africa and Asia, urban dwellers represent about a third of the total populations. However, there are significant variations between individual countries. In Africa, for example, more than 50 per cent of the population of Algeria, South Africa and Tunisia reside in urban regions.

In addition, there is a continuing trend towards ever-largest urban agglomerations. By the turn of the century, 261 cities in developing countries will have populations over 1 million, compared with 213 in the

mid-1990s. In 1994, there were14 so-called "mega-cities," defined as cities with at least 10 million inhabitants. Their number is expected to double by 2015.

Urbanization usually accompanies social and economic development, but rapid urban growth on today's scale strains the captain of local and national governments to provide even the most basic of services such as water, electricity and sewerage. Squatter settlements and over-crowded slums are home to tens of millions, like the favelas that cling to the hillsides of Rio de Janeiro and the tombs used as homes by tens of thousands in Cairo's "Town of the Dead". In some developing countries, notably in Africa, this growth reflects rural crisis rather than urban-based development.

1.4.2 International Movement

Although dwarfed by the movements of people within borders, international movement is also increasing. Roughly half of the over 125 million people living outside their countries of origin reside in developing countries. This figure includes the 1997 figure of 12.0 million refugees. International movement includes both permanent movement and so-called temporary or labor movement -- which may be for long periods, even decades -- as well as the movement of refugees and undocumented migrants.

As with movement in the cities, people move in search of a better life for themselves and their families. Income disparities among and within regions is one motivating factor, as are the labor and movement policies of sending and receiving countries. Political conflict drives movement across borders as well as within countries. Environmental degradation, including the loss of farmland, forests and pasture, also pushes people to leave their homes. Most "environmental refugees", however, go to cities rather than abroad.

Movement of more educated young people from developing countries to fill gaps in the workforces of industrialized countries has been a feature of development in the recent past. In many receiving countries, industries and infrastructure are built and maintained, in part, by migrant labor. Remittances from migrants are a significant source of foreign exchange and in some countries even account for a substantial share of national income. Remittances are used in many ways: for consumer goods, building homes, for productive investments, for education and health services and, in general, contribute to higher living standards for remittance-dependent households.

Richer countries' investment in health and education in developing countries would help foster long-term cooperation in managing movement pressures and improve the productive capabilities both of migrants and those who remain at home. While younger adults are more likely to migrate than older people, women make up nearly half of the international migrant population. Family reunification policies of receiving countries are one factor influencing movement by women, but women themselves are increasingly likely to move in search of jobs. Women frequently end up in the low-status, low-wage production and service jobs, and are particularly vulnerable to exploitation and abuse, including sexual abuse.

Among refugees, women and children are in the majority. At the end of 1997, the number of refugees outside their countries of origin totalled 12.0 million. The figure does not include people in refugee-like situations who have sought asylum in other countries. Nor does it reflect the movement of displaced persons within national borders. At 1997, UNHCR estimated this total "population of concern", including returnees and those seeking asylum and/or refugee status, as numbering 22 million; a number which may have increased since. Ultimately, the goal of both sending and receiving countries should be to make the option of remaining in one's home country a viable one, as is stated in the ICPD Program of Action. But

this goal will not be easily realized. Efforts to enhance economic opportunity, to sustain and improve agricultural production and to provide health care and education are among the strategies proposed by the ICPD at Cairo. Equally important, however, are strategies to resolve political conflict, end human rights violations and promote good governance.

The economic, demographic and political trends influencing movement are likely to continue over the next few decades, given the time it will take to implement the strategies recommended in Cairo. The challenge for governments lies in formulating movement policies that take into account the economic constraints of receiving countries as well as the impact of movement on host societies and its effects on countries of origin.

1.4.3 Moving to work

The majority of migrants crosses borders in search of better economic and social opportunities. Economic migrants are the world's fastest growing group of migrants. Globalization has increased the mobility of labor, and a decline in fertility and working-age populations in many developed countries is leading to a rising demand for workers from abroad to sustain national economies. New patterns of movement have arisen, and many countries that once sent migrants abroad — for example, Argentina, Ireland and South Korea — are now experiencing migrant inflows as well.

Several million people migrate without proper authorization each year, according to the International Organization for Movement . Such migrants often face dangerous journeys, exploitation by criminal smuggling networks, difficult working and living circumstances, and intolerance when they arrive on foreign soil. Their irregular status often leaves them afraid to seek help when their rights are violated.

1.4 .4 Increased female movement

One of the most significant changes in movement patterns in the last half century is that more women are migrating than ever before. Women now constitute half the international migrant population, and in some countries, as much as 70 or 80 per cent. As women migrants frequently end up in low-status, low-wage production and service jobs and often work in gender-segregated and unregulated sectors of the economy, such as domestic work, they are exposed to a much higher risk of exploitation, violence and abuse. Women migrants are particularly vulnerable to human trafficking for the purposes of sexual exploitation, a multimillion-dollar business. Trafficked women are exposed to sexual violence and sexually transmitted infections, including HIV, yet they have little access to medical or legal services.

1.4 .5 Movement and development

Movement is increasingly being perceived as a force that can contribute to development, and an integral aspect of the global development process. Movement considerations are being incorporated into broader planning policies, and will have an impact on the achievement of the Millennium Development Goals and post 2015 development strategies.

Movement is often temporary or circular, and many migrants maintain links with their home countries. While migrants make important contributions to the economic prosperity of their host countries, the flow of financial, technological, social and human capital back to their countries of origin also is having a significant impact on poverty reduction and economic development. Remittances from migrants are a major source of capital for developing countries.

Remittance flows to developing countries are estimated to total \$406 billion in 2012, an increase of 6.5 per cent over the previous year. Global remittance flows, including those to high-income countries, were an estimated \$534 billion in 2012. Possibly twice this amount was transferred informally. These financial transfers are growing in significance. In many countries, they are larger than either development assistance or foreign direct investment. Available data show that women send home a higher proportion of their earnings than do men. These contributions feed and educate children and generally improve the living standards of loved ones left behind.

Attention is being drawn to measure to counteract the negative effects of 'brain drain', to encourage migrants to invest in their countries of origin and bring their knowledge, skills and technical expertise to the development process.

1.4.6 Movement and population growth

High fertility and rapid population growth in some developing countries create pressures to emigrate by taxing infrastructures, education, health and social service systems and the environment. At the same time, movement has become an important component of population growth in countries where fertility has declined. In some parts of Europe and Asia, movement is mitigating depopulation resulting from below-replacement fertility and population ageing. Net movement has already either prevented depopulation or contributed to population growth in a number of countries.

1.4.7 Population, Movement, and Globalization

Globalization is not internationalization, but the effective erasure of national boundaries-opening the way not only to free mobility of capital and goods but also, in effect, to free movement (or uncontrolled movement) of vast labor pools from regions of rapid population growth. The impacts on national economies could be tragic.

The trend toward globalization (free trade, free capital mobility) is not usually associated with movement or demography. If globalization were to be accomplished by the free mobility of people, then demographers would certainly be paying attention. However, since globalization is being driven primarily by "free movement " of goods and capital, with labor a distant third in terms of mobility, few have noticed that the economic consequences of this free flow of goods and capital are equivalent to those that would obtain under a free flow of labor. They are also driven by the same demographic and economic forces that would determine labor movement , if labor were free to migrate.

The economic tendency resulting from the competition is to equalize wages and social standards across countries. But instead of cheap labor moving to where the capital is, and bidding wages down, capital moves to where the cheap labor is, and bids wages up-or would do so if only there were not a nearly unlimited supply of cheap labor, a Malthusian situation that still prevails in much of the world. Yet wages in the capital-sending country are bid down as much as if the newly employed laborers in the low-wage country had actually immigrated to the high-wage country. The determinant of wages in the low-wage country is not labor "productivity," nor anything else on the demand side of the labor market. It is entirely on the supply side-an excess and rapidly growing supply of labor at near-subsistence wages. This demographic condition-a very numerous and still rapidly growing underclass in the third world-is one for which demographers have many explanations, beginning with Malthus.

Globalization, considered by many to be the inevitable wave of the future, is frequently confused with internationalization, but is in fact something totally different. Internationalization refers to the increasing importance of international trade, international relations, treaties, alliances, etc. International, of course,

means between or among nations. The basic unit remains the nation, even as relations among nations become increasingly necessary and important. Globalization refers to the global economic integration of many formerly national economies into one global economy, mainly by free trade and free capital mobility, but also by somewhat easier or uncontrolled movement . It is the effective erasure of national boundaries for economic purposes. What was international becomes interregional.

The word "integration" derives from "integer," meaning one, complete, or whole. Integration is the act of combining into one whole. Since there can be only one whole, it follows that global economic integration logically implies national economic disintegration. As the saying goes, to make an omelette you have to break some eggs. The dis-integration of the national egg is necessary to integrate the global omelette. It is dishonest to celebrate the benefits of global integration without counting the consequent costs of national disintegration.

1.4.8 Forgotten Root

Those costs are significant. It is not for nothing that the population explosion in the third world only recently affected wages in the industrial world. The British did not allow colonial India, for instance, to compete in global markets with its cheap labor, nor did the Chinese seek to do so under the isolation policies of Chairman Mao. Only in the last 30 years has the World Bank become converted to the now "incontestable" orthodoxy of export-led development based on foreign investment as the key part of structural adjustment. But although "free trade" is the new mantra, it now means something very different from what it meant in the early nineteenth century, when English economist David Ricardo gave it the enduring blessing of his comparative advantage argument.

In the classical nineteenth-century vision of Ricardo and Adam Smith, the national community embraced both national labor and national capital. These classes cooperated (albeit with conflict) to produce national goods, which then competed in international markets against the goods of other nations produced by their own national capital/labor teams. This was internationalization, as defined above.

However, in the globally integrated world of the twenty-first century, both capital and goods are free to move internationally-and capital, or at least money, can be shifted electronically with almost no effort at all. But free capital mobility totally undercuts the Ricardo's comparative advantage argument for free trade in goods, because that argument is explicitly and essentially premised on capital (and other factors) being immobile between nations. Under the new globalization regime, capital tends simply to flow to wherever costs are lowest-that is, to pursue absolute advantage.

Nevertheless, the conventional wisdom seems to be that if free trade in goods is beneficial, then free trade in capital must be even more beneficial. However, you cannot use the conclusion of an argument to deny one of its premises! In any event, it no longer makes sense to think of national teams of labor and capital in the globalized economy. There are competing global capitalists, and national laborers thrown into global competition by mobile capital.

Back, finally, to the costs mentioned above. What are the consequences of globalization for national community? Here in the United States, we have seen the abrogation of a basic social agreement between labor and capital over how to divide up the value that they jointly add to raw materials (as well as the value of the raw materials themselves, i.e., nature's often-uncounted value added). That agreement has been reached nationally, not internationally, much less globally. It was not reached by economic theory, but through generations of national debate, elections, strikes, lockouts, court decisions, and violent conflicts. That agreement, on which national community and industrial peace depend, is being repudiated in the interests of global integration. That is a very poor trade, even if you call it "free trade."

1.4 .9 Stresses and Strains

At a deeper level, what if globalization began to entail the overt encouragement of free movement ? Even some free trade advocates might recoil from the radical cosmopolitanism of such a policy. Perhaps they can see that it would lead to massive relocation of people between world regions of vastly differing wealth, creating a tragedy of the open access commons. The strain on local communities, both the sending and the receiving, would be enormous. In the face of unlimited movement , how could any national community maintain a minimum wage, a welfare program, subsidized medical care, or a public school system? How could a nation punish its criminals and tax evaders if citizens were totally free to emigrate? Indeed, one wonders, would it not be much cheaper to encourage movement of a country's poor, sick, or criminals, rather than run welfare programs, charity hospitals, and prisons?

Further, one might reasonably wonder how a country could reap the benefit of educational investments made in its own citizens if those citizens are totally free to emigrate. World nations continue to make such investments in the face of free movement and a continuing "brain drain"? Would a country make investments in education if it experienced massive movement pressures, which would dilute the educational resources of the nation? Would any country any longer try to limit its birth rate, since youths who migrate abroad and send back remittances can be a good investment, a fact that might increase the birth rate? (With unfettered movement , a country could never control its numbers anyway, so why even talk about the controversial issue of birth control?)

To some this skepticism will sound like a nationalistic negation of the world community. It is not. It is the view that the world community should be viewed as a "community of communities," a federation of national communities rather than a cosmopolitan world government lacking any historical roots in real communities. A "world with no boundaries" makes a sentimental song lyric, but community and policy cannot exist without boundaries. For mainstream-neoclassical-economists, only the individual is real; community is just a misleading name for an aggregate of individuals. From that perspective, national communities impose "distorting" interferences upon the individualistic free market, and their disintegration is not a cost but something to be welcomed. To the contrary, I would argue, this aspect of globalization is just another way in which capitalism undermines the very circumstances it requires in order to function.

Few would deny that some movement is a very good thing-but this discussion concerns free movement , where "free" means deregulated, uncontrolled, unlimited, as in "free" trade, or "free" capital mobility, or "free" reproduction. One must also be intensely mindful that immigrants are people, frequently disadvantaged people. It is a terrible thing to be "anti-immigrant." movement , however, is a policy, not a person, and one can be "anti-movement ," or more accurately "pro-movement limits" without in the least being anti-immigrant. The global cosmopolitans think that it is immoral to make any policy distinction between citizen and noncitizen, and therefore favor free movement . They also suggest that free movement is the shortest route to their vision of the summum bonum, equality of wages worldwide. Their point is fair enough; there is some logic in their position-so long as they are willing to see wages equalized at a low level. But those who support the free movement as the shortest route to equality of wages worldwide could only with great difficulty try to contend with problems of an open-access commons, the destruction of the local community, and other issues raised above.

A more workable moral guide is the recognition that, as a member of a national community, one's obligation to non-citizens is to do them no harm, while one's obligation to fellow citizens is first to do no harm and then try to do positive good. The many dire consequences of globalization (besides those mentioned above)-over-specialization in a few volatile export commodities (petroleum, timber, minerals, and other extractive goods with little value added locally, for instance), crushing debt burdens, exchange

rate risks and speculative currency destabilization, foreign corporate control of national markets, unnecessary monopolization of "trade-related intellectual property rights" (typically patents on prescription drugs), and not least, easy immovement in the interests of lower wages and cheaper exports-amply show that the "do no harm" criterion is still far from being met.

Some feel that U.S. economic policies have harmed third-world citizens, and that ease movement in the U.S. is a justified form of restitution. We have considerable sympathy with the view that U.S. policies (precisely those of globalization) have harmed third-world citizens, but for reasons already stated, no sympathy with the idea that easy movement is a fair or reasonable restitution.

1.4 .10 Free Trade's Hidden Shackles

Free trade, specialization, and global integration mean that nations are no longer free not to trade. Yet freedom not to trade is surely necessary if trade is to remain voluntary, a precondition of its mutual benefit. To avoid war, nations must both consume less and become more self-sufficient. But free traders say we should become less self-sufficient and more globally integrated as part of the overriding quest to consume ever more. We must lift the laboring masses (which now include the formerly high-wage workers) up from their subsistence wages. This can only be done by massive growth, we are told. But can the environment sustain so much growth? It cannot. And how will whatever growth dividend there is ever get to the poor, i.e., how can wages increase given the nearly unlimited supply of labor? If wages do not increase then what reason is there to expect a fall in the birth rate of the laboring class via the "demographic transition"? How could we ever expect to have high wages in any country that becomes globally integrated with a globe having a vast oversupply of labor? Why, in a globally integrated world, would any nation have an incentive to reduce its birth rate?

Global economic integration and growth, far from bringing a halt to population growth, will be the means by which the consequences of overpopulation in the third world are generalized to the globe as a whole. They will be the means whereby the practice of constraining births in some countries will be eliminated by a demographic version of the "race to the bottom," rather than spread by demonstration of its benefits. In the scramble to attract capital and jobs, there will be a standard-lowering competition to keep wages low and to reduce any social, safety, and environmental standards that raise costs.

Some are seduced by the idea of "solving" the South's population problem and the North's labor shortage problem simultaneously-by movement . However, the North's labor shortage is entirely a function of below-equilibrium wages. The shortage could be instantly removed by an increase in wages that equated domestic supply and demand-simply by allowing the market to work. But the cheap-labor lobby, in the United States at least, thinks we must import workers in order to keep wages from rising and thereby reducing profits and export competitiveness. Of course this also keeps 80 percent of our citizens from sharing in the increased prosperity through higher wages. But never mind! They will still benefit, because importing workers are the key to saving Social Security-which, we are told, will collapse without growth in the cohort of working-age people provided by movement and when the large cohort of worker-immigrants retires? Well, we will just repeat the process.

The real solution to the Social Security imbalance is to raise the age of retirement and lower the benefits. The real solution to the South's problem is for those countries to lower their birth rates and to put their working-age population to use at home producing necessities for the home market. And the reply to the half-truth that the United States is really more overpopulated than India because each American consumes so much more than each Indian, is that the United States needs mainly to lower its per capita consumption (and secondarily its population growth), while India and China need primarily to lower their population growth, and are in no position to lower per capita consumption, except for the elite. Serious efforts to

reduce birth rates in these countries are sometimes condemned, because, with the advent of ultrasound technology that can determine the gender of the fetus, the cultural preference for males has led to selective abortion of females. The problem here is neither birth control nor ultrasound but the immoral preference for males and indifference to the social costs of a gender imbalance a generation hence.

Demographers and economists have understandably become reluctant to prescribe birth control to other countries. If a country historically "chooses" many people, low wages, and high inequality over fewer people, higher wages, and less inequality, who is to say that is wrong? Let all make their own choices, since it is they who will have to live with the consequences.

But while that may be a defensible position under internationalization, it is not defensible under globalization. The whole point of an integrated world is that these consequences, both costs of overpopulation and benefits of population control, are externalized to all nations. The costs and benefits of overpopulation under globalization are now distributed by class more than by nation. Labor bears the cost of reduced wage income; capital enjoys the benefit of reduced wage costs. Malthusian and Marxian considerations both seem to foster inequality. The old conflict between Marx and Malthus, always more ideological than logical, has now for practical purposes been further diminished. After all, both always held that wages tend toward subsistence under capitalism. Marx would probably see globalization as one more capitalist strategy to lower wages. Malthus might agree, while arguing that it is the fact of overpopulation that allows the capitalist's strategy to work in the first place. Presumably Marx would accept that, but insist that the overpopulation is only relative to capitalist institutions, not to any limits of nature's bounty, and would not exist under socialism. Malthus would disagree, along with the post-Mao Chinese communists.

Review Questions

- 1. Define the Population?
- 2. Explain the Geographical Analysis of Population?
- 3. Explain the Population Growth and Decline?
- 4. Explain the Population Decline?

Discussion Questions

Discuss the Population Movement and its effect?

Ch2- Cultural Patterns and Processes

Learning Objectives

- To define the culture.
- To explain the Cultural Differences.
- To explain the Cultural Landscapes.
- To describe the Cultural Identity.

2.1 Concepts of Culture

Culture is a modern idea based on a term first used in classical antiquity by the Roman orator Cicero: "*cultura animi*". This non-agricultural use of the term "*culture*" re-appeared in modern Europe in the 17th century referring to the betterment or refinement of individuals, especially through education. During the 18th and 19th century it came to refer more frequently to the common reference points of whole peoples, and discussion of the term was often connected to national aspirations or ideals. Some scientists used the term "culture" to refer to a universal human capacity.

In the 20th century, "culture" emerged as a central idea in anthropology, encompassing the range of human phenomena that cannot be attributed to genetic inheritance. Specifically, the term "culture" in American anthropology had two meanings:

- 1. The evolved human capacity to classify and represent experiences with symbols, and to act imaginatively and creatively; and
- 2. The distinct ways that people living differently classified and represented their experiences, and acted creatively.

Hoebel describes culture as an integrated system of learned behavior patterns which are characteristic of the members of a society and which are not a result of biological inheritance.

Distinctions are presently made between the physical artifacts created by a society, its so-called material culture, and everything else, the intangibles such as language, customs, etc. that are the main referent of the term "culture".

2.1.1 Etymology

The term "culture," which originally meant the cultivation of the soul or mind, acquires most of its later modern meaning in the writings of the 18th-century German thinkers, who on various levels developing Rousseau's criticism of "modern liberalism and Enlightenment". Thus a contrast between "culture" and "civilization" is usually implied by these authors, even when not expressed as such. Two primary meanings of culture emerge from this period: culture as the folk-spirit having a unique identity, and culture as cultivation of waywardness or free individuality. The first meaning is predominant in our current use of the term "**culture**," although the second still plays a large role in what we think culture should achieve, namely the full "expression" of the unique or "authentic" self.

2.1.2 Aspects of culture

Aspects of human expression include both material culture and ephemeral elements. These include:

- Language and dialect
- Science
- Technology
- Cuisine
- Aesthetics art, music, literature, fashion, and architecture
- Values, ideology
- Social conventions, including norms, taboos, and etiquette
- Gender roles
- Recreational activities such as festivals and holidays
- Commercial practices
- Social structure
- Religion

Cultural regions are often defined with respect to an ethnolinguistic group or religion; the larger cultural groupings are sometimes referred to as "civilizations". Subcultures have distinct aspects, but share a connection with a larger culture (whether by virtue of inhabiting the same society or by inheriting certain cultural elements). Individuals can participate in multiple cultures and subcultures; countercultures specifically reject at least some aspects of mainstream culture.

Cultural identities and subcultures can be defined along any of these lines, or others; for example:

- Profession e.g. truck driver culture
- Workplace organizational culture
- Time and place e.g. the Victorian era in the British Empire
- An archaeological culture, defined by similar artifacts
- Broad geography e.g. Western culture
- Narrow geography e.g. Culture of the United States, National dress
- Unified system of writing conventions e.g. IETF language tags used for internationalization and localization in computing
- Ethnic minority e.g. African-American culture
- Sexuality and gender identity-based cultures
- Individual adoption of cultural style e.g. Goth subculture
- Social class, caste, or socioeconomic status High culture (usually referring to artistic culture) might be differentiated from low culture, folk culture, or middlebrow culture
- Audience e.g. popular culture
- Technology e.g. cyberculture, video game culture
- Cultural landscape

Mutual communication (whether through technology or transportation of people or goods) is an essential activity which maintains the coherence of a cultural group. This explains why cultural boundaries can follow divisions in language and geography, why globalization has created larger cultural spheres, and highlights the role of mass media in defining and maintaining culture. Education and tradition communicate culture through time.

A given nation-state or society may have a single, dominant culture to which immigrants assimilate (the melting pot model), or be multicultural (the salad bowl/cultural mosaic model).

Cultural conflict can arise within a society or between different societies with different cultures.

2.1.3 Change

Cultural invention has come to mean any innovation that is new and found to be useful to a group of people and expressed in their behavior but which does not exist as a physical object. Humanity is in a global "accelerating culture change period," driven by the expansion of international commerce, the mass media, and above all, the human population explosion, among other factors.

Cultures are internally affected by both forces encouraging change and forces resisting change. These forces are related to both social structures and natural events, and are involved in the perpetuation of cultural ideas and practices within current structures, which themselves are subject to change.

Social conflict and the development of technologies can produce changes within a society by altering social dynamics and promoting new cultural models, and spurring or enabling generative action. These social shifts may accompany ideological shifts and other types of cultural change. For example, the U.S. feminist movement involved new practices that produced a shift in gender relations, altering both gender and economic structures. Environmental circumstances may also enter as factors. For example, after tropical forests returned at the end of the last ice age, plants suitable for domestication were available, leading to the invention of farming, which in turn brought about many cultural innovations and shifts in social dynamics.

Cultures are externally affected via contact between societies, which may also produce—or inhibit social shifts and changes in cultural practices. War or competition over resources may impact technological development or social dynamics. Additionally, cultural ideas may transfer from one society to another, through diffusion or acculturation. In diffusion, the form of something (though not necessarily its meaning) moves from one culture to another. For example, hamburgers, fast food in the United States, seemed exotic when introduced into China. "Stimulus diffusion" (the sharing of ideas) refers to an element of one culture leading to an invention or propagation in another. "Direct Borrowing" on the other hand tends to refer to technological or tangible diffusion from one culture to another. Diffusion of innovations theory presents a research-based model of why and when individuals and cultures adopt new ideas, practices, and products.

Acculturation has different meanings, but in this context refers to replacement of the traits of one culture with those of another, such has happened to certain Native American tribes and to many indigenous peoples across the globe during the process of colonization. Related processes on an individual level include assimilation (adoption of a different culture by an individual) and transculturation.

2.1.4 Early modern discourses

2.1.4.1 German Romanticism

The German philosopher Immanuel Kant (1724–1804) has formulated an individualist definition of "enlightenment" similar to the idea of *bildung*: "Enlightenment is man's emergence from his self-incurred immaturity." He argued that this immaturity comes not from a lack of understanding, but from a lack of courage to think independently. Against this intellectual cowardice, Kant urged: *Sapere aude*, "Dare to be wise!" In reaction to Kant, German scholars such as Johann Gottfried Herder (1744–1803) argued that human creativity, which necessarily takes unpredictable and highly diverse forms, is as important as

human rationality. Moreover, Herder proposed a collective form of *bildung*: "For Herder, Bildung was the totality of experiences that provide a coherent identity, and sense of common destiny, to a people."

In 1795, the great linguist and philosopher Wilhelm von Humboldt (1767–1835) called for an anthropology that would synthesize Kant's and Herder's interests. During the Romantic era, scholars in Germany, especially those concerned with nationalist movements—such as the nationalist struggle to create a "Germany" out of diverse principalities, and the nationalist struggles by ethnic minorities against the Austro-Hungarian Empire—developed a more inclusive notion of culture as "worldview." According to this school of thought, each ethnic group has a distinct worldview that is incommensurable with the worldviews of other groups. Although more inclusive than earlier views, this approach to culture still allowed for distinctions between "civilized" and "primitive" or "tribal" cultures.

In 1860, Adolf Bastian (1826–1905) argued for "the psychic unity of mankind". He proposed that a scientific comparison of all human societies would reveal that distinct worldviews consisted of the same basic elements. According to Bastian, all human societies share a set of "elementary ideas" (*Elementargedanken*); different cultures, or different "folk ideas" (*Völkergedanken*), are local modifications of the elementary ideas. This view paved the way for the modern understanding of culture. Franz Boas (1858–1942) was trained in this tradition, and he brought it with him when he left Germany for the United States.

2.1.4.2 English Romanticism

In the 19th century, humanists such as English poet and essayist Matthew Arnold (1822–1888) used the word "culture" to refer to an ideal of individual human refinement, of "the best that has been thought and said in the world." This idea of culture is comparable to the German idea of building: "...culture being a pursuit of our total perfection by means of getting to know, on all the matters which most concern us, the best which has been thought and said in the world."

In practice, *culture* referred to an élite ideal and was associated with such activities as art, classical music, and haute cuisine. As these forms were associated with urban life, "culture" was identified with "civilization" (from lat. *civitas*, town). Another facet of the Romantic movement was an interest in folklore, which led to identifying a "culture" among non-elites. This distinction is often characterized as that between high culture, namely that of the ruling social group, and low culture. In other words, the idea of "culture" that developed in Europe during the 18th and early 19th centuries reflected inequalities within European societies.

Matthew Arnold contrasted "culture" with anarchy; other Europeans, following philosophers Thomas Hobbes and Jean-Jacques Rousseau, contrasted "culture" with "the state of nature". According to Hobbes and Rousseau, the Native Americans who were being conquered by Europeans from the 16th centuries on were living in a state of nature; this opposition was expressed through the contrast between "civilized" and "uncivilized." According to this way of thinking, one could classify some countries and nations as more civilized than others and some people as more cultured than others. This contrast led to Herbert Spencer's theory of Social Darwinism and Lewis Henry Morgan's theory of cultural evolution. Just as some critics have argued that the distinction between high and low cultures is really an expression of the conflict between European elites and non-elites, some critics have argued that the distinction between civilized and uncivilized people is really an expression of the conflict between European colonial powers and their colonial subjects. Other 19th century critics, following Rousseau, have accepted this differentiation between higher and lower culture, but have seen the refinement and sophistication of high culture as corrupting and unnatural developments that obscure and distort people's essential nature. These critics considered folk music (as produced by "the folk", i.e., rural, illiterate, peasants) to honestly express a natural way of life, while classical music seemed superficial and decadent. Equally, this view often portrayed indigenous peoples as "noble savages" living authentic and unblemished lives, uncomplicated and uncorrupted by the highly stratified capitalist systems of the West.

In 1870 Edward Tylor (1832–1917) applied these ideas of higher versus lower culture to propose a theory of the evolution of religion. According to this theory, religion evolves from more polytheistic to more monotheistic forms. In the process, he redefined culture as a diverse set of activities characteristic of all human societies. This view paved the way for the modern understanding of culture.

2.1.5 20th century discourses

2.1.5.1 American anthropology

Although anthropologists worldwide refer to Tylor's definition of culture, in the 20th century "culture" emerged as the central and unifying idea of American anthropology, where it most commonly refers to the universal human capacity to classify and encode human experiences symbolically, and to communicate symbolically encoded experiences socially. American anthropology is organized into four fields, each of which plays an important role in research on culture:

- 1. Biological anthropology
- 2. Linguistic anthropology
- 3. Cultural anthropology
- 4. Archaeology

Research in these fields has influenced anthropologists working in other countries to different degrees.

2.1.5.2 Biological anthropology

Discussion concerning culture among biological anthropologists centers around two debates. First, is culture uniquely human or shared by other species (most notably, other primates)? This is an important question, as the theory of evolution holds that humans are descended from (now extinct) non-human primates. Second, how did culture evolve among human beings?

Gerald Weiss noted that although Tylor's classic definition of culture was restricted to humans, many anthropologists take this for granted and thus elide that important qualification from later definitions, merely equating culture with any learned behavior. This slippage is a problem because during the formative years of modern primatology, some primatologists were trained in anthropology (and understood that culture refers to learned behavior among humans), and others were not. A notable non-anthropologists, like Robert Yerkes and Jane Goodall thus argued that since chimpanzees have learned behaviors, they have culture. Today, anthropological primatologists are divided, several arguing that non-human primates have culture, others arguing that they do not.

This scientific debate is complicated by ethical concerns. The subjects of primatology are non-human primates, and whatever culture these primates have is threatened by human activity. After reviewing the research on primate culture, W.C. McGrew concluded, "[a] discipline requires subjects, and most species

of nonhuman primates are endangered by their human cousins. Ultimately, whatever its merit, cultural primatology must be committed to cultural survival [i.e. to the survival of primate cultures]."

McGrew suggests a definition of culture that he finds scientifically useful for studying primate culture. He points out that scientists do not have access to the subjective thoughts or knowledge of non-human primates. Thus, if culture is defined in terms of knowledge, then scientists are severely limited in their attempts to study primate culture. Instead of defining culture as a kind of knowledge, McGrew suggests that we view culture as a process. He lists six steps in the process:

- 1. A new pattern of behavior is invented, or an existing one is modified.
- 2. The innovator transmits this pattern to another.
- 3. The form of the pattern is consistent within and across performers, perhaps even in terms of recognizable stylistic features.
- 4. The one who acquires the pattern retains the ability to perform it long after having acquired it.
- 5. The pattern spreads across social units in a population. These social units may be families, clans, troops, or bands.
- 6. The pattern endures across generations.

McGrew admits that all six criteria may be strict, given the difficulties in observing primate behavior in the wild. But he also insists on the need to be as inclusive as possible, on the need for a definition of culture that "casts the net widely":

Culture is considered to be grouped-specific behavior that is acquired, at least in part, from social influences. Here, the group is considered to be the species-typical unit, whether it is a troop, lineage, subgroup, or so on. *Prima facie* evidence of culture comes from within-species but across-group variation in behavior, as when a pattern is persistent in one community of chimpanzees but is absent from another, or when different communities perform different versions of the same pattern. The suggestion of culture in action is stronger when the difference across the groups cannot be explained solely by ecological factors

As Charles Frederick Voegelin pointed out, if "culture" is reduced to "learned behavior," then all animals have culture. Certainly all specialists agree that all primate species evidence common cognitive skills: knowledge of object-permanence, cognitive mapping, the ability to categorize objects, and creative problem solving. Moreover, all primate species show evidence of shared social skills: they recognize members of their social group; they form direct relationships based on degrees of kinship and rank; they recognize third-party social relationships; they predict future behavior; and they cooperate in problem-solving.

Nevertheless, the term "culture" applies to non-human animals only if we define culture as any or all learned behavior. Within mainstream physical anthropology, scholars tend to think that a more restrictive definition is necessary. These researchers are concerned with how human beings evolved to be different from other species. A more precise definition of culture, which excludes non-human social behavior, would allow physical anthropologists to study how humans evolved their unique capacity for "culture".

Chimpanzees (*Pan troglodytes* and *Pan paniscus*) are humans' (*Homo sapiens*) closest living relative; both are descended from a common ancestor which lived around five or six million years ago. This is the same amount of time it took for horses and zebras, lions and tigers to diverge from their respective common ancestors. The evolution of modern humans is rapid: *Australopithicenes* evolved four million years ago and modern humans in past several hundred thousand years. During this time humanity evolved three distinctive features:

(a) the creation and use of conventional symbols, including linguistic symbols and their derivatives, such as written language and mathematical symbols and notations; (b) the creation and use of complex tools and other instrumental technologies; and (c) the creation and participation in complex social organization and institutions.

According to developmental psychologist Michael Tomasello, "where these complex and species-unique behavioral practices, and the cognitive skills that underlie them, came from" is a fundamental anthropological question. Given that contemporary humans and chimpanzees are far more different from horses and zebras, or rats and mice, and that the evolution of this great difference occurred in such a short period of time, "our search must be for some small difference that made a big difference – some adaptation, or small set of adaptations, that changed the process of primate cognitive evolution in fundamental ways." According to Tomasello, the answer to this question must form the basis of a scientific definition of "human culture."

In a recent review of the major research on human and primate tool-use, communication, and learning strategies, Tomasello argue that the key human advances over primates (language, complex technologies, and complex social organization) are all the results of humans pooling cognitive resources. This is called "the ratchet effect:" innovations spread and are shared by a group, and mastered "by youngsters, which enables them to remain in their new and improved form within the group until something better comes along." The key point is that children are born good at a particular kind of social learning; this creates a favored environment for social innovations, making them more likely to be maintained and transmitted to new generations than individual innovations. For Tomasello, human social learning—the kind of learning that distinguishes humans from other primates and that played a decisive role in human evolution—is based on two elements: first, what he calls "imitative learning," (as opposed to "emulative learning" characteristic of other primates) and second, the fact that humans represent their experiences symbolically (rather than iconically, as is characteristic of other primates). Together, these elements enable humans to be both inventive, and to preserve useful inventions. It is this combination that produces the ratchet effect.

The kind of learning found among other primates is "emulation learning," which "focuses on the environmental events involved – results or changes of state in the environment that the other produced – rather than on the actions that produced those results." Tomasello emphasizes that emulation learning is a highly adaptive strategy for apes because it focuses on the effects of an act. In laboratory experiments, chimpanzees were shown two different ways for using a rake-like tool to obtain an out-of-reach-object. Both methods were effective, but one was more efficient than the other. Chimpanzees consistently emulated the more efficient method.

Examples of emulation learning are well documented among primates. Notable examples include Japanese macaque potato washing, Chimpanzee tool use, and Chimpanzee gestural communication. In 1953, an 18-month-old female macaque monkey was observed taking sandy pieces of sweet potato (given to the monkeys by observers) to a stream (and later, to the ocean) to wash off the sand. After three months, the same behavior was observed in her mother and two playmates, and then the playmates' mothers. Over the next two years seven other young macaques were observed washing their potatoes, and by the end of the third year 40% of the troop had adopted the practice. Although this story is popularly represented as a straightforward example of human-like learning, evidence suggests that it is not. Many monkeys naturally brush sand off of food; this behavior had been observed in four other separate macaque troops, suggesting that at least four other individual monkeys had learned to wash off sand on their own. Other monkey species in captivity quickly learn to wash off their food. Finally, the spread of learning among the Japanese macaques was fairly slow, and the rate at which new members of the troop learned did not keep pace with the growth of the troop. If the form of learning were imitation, the rate of learning

should have been exponential. It is more likely that the monkeys' washing behavior is based on the common behavior of cleaning off food, and that monkeys that spent time by the water independently learned to wash, rather than wipe their food. This explains both why those monkeys that kept company with the original washer, and who thus spent a good deal of time by the water, also figured out how to wash their potatoes. It also explains why the rate at which this behavior spread was slow.

Chimpanzees exhibit a variety of population-specific tool use: termite-fishing, ant-fishing, ant-dipping, nut-cracking, and leaf-sponging. Gombe Chimpanzees fish for termites using small, thin sticks, but chimpanzees in Western Africa use large sticks to break holes in mounds and use their hands to scoop up termites. Some of this variation may be the result of "environmental shaping" (there is more rainfall in western Africa, softening termite mounds and making them easier to break apart, than in the Gombe reserve in eastern Africa. Nevertheless it is clear that chimpanzees are good at emulation learning. Chimpanzee children independently know how to roll over logs, and know how to eat insects. When children see their mothers rolling over logs to eat the insects beneath, they quickly learn to do the same. In other words, this form of learning builds on activities the children already know.

The kind of learning characteristic of human children is imitative learning, which "means reproducing an instrumental act understood intentionally." Human infants begin to display some evidence of this form of learning between the ages of nine and 12 months, when infants fix their attention not only on an object, but on the gaze of an adult which enables them to use adults as points of reference and thus "act on objects in the way adults are acting on them." This dynamic is well documented and has also been termed "joint engagement" or "joint attention." Essential to this dynamic is the infant's growing capacity to recognize others as "intentional agents:" people "with the power to control their spontaneous behavior" and who "have goals and make active choices among behavioral means for attaining those goals."

The development of skills in joint attention by the end of a human child's first year of life provides the basis for the development of imitative learning in the second year. In one study 14-month old children imitated an adult's over-complex method of turning on a light, even when they could have used an easier and more natural motion to the same effect. In another study, 16-month old children interacted with adults who alternated between a complex series of motions that appeared intentional and a comparable set of motions that appeared accidental; they imitated only those motions that appeared intentional. Another study of 18-month old children revealed that children imitate actions that adults intend, yet in some way fail, to perform.

Tomasello emphasizes that this kind of imitative learning "relies fundamentally on infants' tendency to identify with adults, and on their ability to distinguish in the actions of others the underlying goal and the different means that might be used to achieve it." He calls this kind of imitative learning "cultural learning because the child is not just learning about things from other persons, she is also learning things through them — in the sense that she must know something of the adult's perspective on a situation to learn the active use of this same intentional act." He concludes that the key feature of cultural learning is that it occurs only when an individual "understands others as intentional agents, like the self, who have a perspective on the world that can be followed into, directed and shared."

Emulation learning and imitative learning are two different adaptations that can only be assessed in their larger environmental and evolutionary contexts. In one experiment, chimpanzees and two-year-old children were separately presented with a rake-like-tool and an out-of-reach object. Adult humans then demonstrated two different ways to use the tool, one more efficient, one less efficient. Chimpanzees used the same efficient method following both demonstrations, regardless of what was demonstrated. Most of the human children, however, imitated whichever method the adult was demonstrating. If the chimps and humans were to be compared on the basis of these results, one might think that chimpanzees are more

intelligent. From an evolutionary perspective they are equally intelligent, but with different kinds of intelligence adapted to different environments. Chimpanzee learning strategies are well-suited to a stable physical environment that requires little social cooperation (compared to humans). Human learning strategies are well-suited to a more complex social environment in which understanding the intentions of others may be more important than success at a specific task. Tomasello argues that this strategy has made possible the "ratchet effect" that enabled humans to evolve complex social systems that have enabled humans to adapt to virtually every physical environment on the surface of the earth.

Tomasello further argues that cultural learning is essential for language-acquisition. Most children in any society, and all children in some, do not learn all words through the direct efforts of adults. "In general, for the vast majority of words in their language, children must find a way to learn in the ongoing flow of social interaction, sometimes from speech not even addressed to them." This finding has been confirmed by a variety of experiments in which children learned words even when the referent was not present, multiple referents were possible, and the adult was not directly trying to teach the word to the child. Tomasello concludes that "a linguistic symbol is nothing other than a marker for an intersubjectively shared understanding of a situation."

Tomasello's 1999 review of the research contrasting human and non-human primate learning strategies confirms biological anthropologist Ralph Holloway's 1969 argument that a specific kind of sociality linked to symbolic cognition were the keys to human evolution, and constitute the nature of culture. According to Holloway, the key issue in the evolution of *H. sapiens*, and the key to understanding "culture," "is how man organizes his experience." Culture is "the *imposition of arbitrary form upon the environment*." This fact, Holloway argued, is primary to and explains what is distinctive about human learning strategies, tool-use, and language. Human tool-making and language express "similar, if not identical, cognitive processes" and provide important evidence for how humankind evolved.

In other words, whereas McGrew argues that anthropologists must focus on behaviors like communication and tool-use because they have no access to the mind, Holloway argues that human language and tool-use, including the earliest stone tools in the fossil record, are highly suggestive of cognitive differences between humans and non-humans, and that such cognitive differences in turn explain human evolution. For Holloway, the question is not *whether* other primates communicate, learn or make tools, but the *way* they do these things. "Washing potatoes in the ocean ... stripping branches of leaves to get termites," and other examples of primate tool-use and learning "are iconic, and there is no feedback from the environment to the animal." Human tools, however, express an independence from natural form that manifests symbolic thinking. "In the preparation of the stick for termite-eating, the relation between product and raw material is iconic. In the making of a stone tool, in contrast, there is no necessary relation between the form of the final product and the original material."

In Holloway's view, our non-human ancestors, like those of modern chimpanzees and other primates, shared motor and sensory skills, curiosity, memory, and intelligence, with perhaps differences in degree. He adds: "It is when these are integrated with the unique attributes of arbitrary production (symbolization) and imposition that man qua cultural man appears.".

He also adds:

I have suggested above that whatever culture may be, it includes "the imposition of arbitrary forms upon the environment." This phrase has two components. One is a recognition that the relationship between the coding process and the phenomenon (be it a tool, social network, or abstract principle) is non-iconic. The other is an idea of man as a creature who can make delusional systems work—who imposes his fantasies, his non-iconic constructs (and constructions), upon the environment. The altered environment shapes his perceptions, and these are again forced back on the environment, are incorporated into the environment, and press for further adaptation.

This is comparable to the "ratcheting" aspect suggested by Tomasello and others that enabled human evolution to accelerate. Holloway concludes that the first instance of symbolic thought among humans provided a "kick-start" for brain development, tool complexity, social structure, and language to evolve through a constant dynamic of positive feedback. "This interaction between the propensity to structure the environment arbitrarily and the feedback from the environment to the organism is an emergent process, a process different in kind from anything that preceded it."

Linguists Charles Hockett and R. Ascher have identified thirteen design-features of language, some shared by other forms of animal communication. One feature that distinguishes human language is its tremendous productivity; in other words, competent speakers of a language are capable of producing an exponential number of original utterances. This productivity seems to be made possible by a few critical features unique to human language. One is "duality of patterning," meaning that human language consists of the articulation of several distinct processes, each with its own set of rules: combining phonemes to produce morphemes, combining morphemes to produce words, and combining words to produce sentences. This means that a person can master a relatively limited number of signals and sets of rules, to create infinite combinations. Another crucial element is that human language is symbolic: the sound of words (or their shape, when written) typically bears no relation to what they represent. In other words, their meaning is arbitrary. That words have meaning is a matter of convention. Since the meaning of words are arbitrary, any word may have several meanings, and any object may be referred to using a variety of words; the actual word used to describe a particular object depends on the context, the intention of the speaker, and the ability of the listener to judge these appropriately. As Tomasello notes,

An individual language user looks at a tree and, before drawing the attention of her interlocutor to that tree, must decide, based on her assessment of the listener's current knowledge and expectations, whether to say "that tree over there," "it," "the oak," "that hundred-year-oak," "the tree," "the bag swing tree," "that thing in the front yard," "the ornament," "the embarrassment," or any of a number of other expressions. ... And these decisions are not made on the basis of the speaker's direct goal with respect to the object or activity involved, but rather that they are made on the basis of her goal with respect to the listener's interest and attention to that object or activity. This is why symbolic cognition and communication and imitative learning go hand-in-hand.

Holloway argues that the stone tools associated with genus *Homo* have the same features of human language:

Returning to matter of syntax, rules, and concatenated activity mentioned above, almost any model which describes a language process can also be used to describe tool-making. This is hardly surprising. Both activities are concatenated, both have rigid rules about the serialization of unit activities (the grammar, syntax), both are hierarchical systems of activity (as is any motor activity), and both produce arbitrary configurations which thence become part of the environment, either temporarily or permanently.

He also adds:

Productivity can be seen in the facts that basic types were probably used for multiple purposes, that tool industries tend to expand with time, and that a slight variation on a basic pattern may be made to meet some new functional requisite. *Elements of a basic "vocabulary" of motor operations—flakes, detachment, rotation, preparation of striking platform, etc..—are used in different combinations to produce dissimilar tools, with different forms, and supposedly, different uses.... Taking each motor*

event alone, no one action is complete; each action depends on the prior one and requires a further one, and each is dependent on another ax on the original plan. In other words, at each point of the action except the last, the piece is not "satisfactory" in structure. Each unit action is meaningless by itself in the sense of the use of the tool; it is meaningful only in the context of the whole completed set of actions culminating in the final product. This exactly parallels language.

As Tomasello demonstrates, symbolic thought can operate only in a particular social environment:

Arbitrary symbols enforce consensus of perceptions, which not only allows members to communicate about the same objects in terms of space and time (as in hunting) but it also makes it possible for social relationships to be standardized and manipulated through symbols. It means that idiosyncrasies are smoothed out and perceived within classes of behavior. By enforcing perceptual invariance, symbols also enforce social behavioral constancy, and enforcing social behavioral constancy is a prerequisite to differential task-role sectors in a differentiated social group adapting not only to the outside environment but to its own membership.

Biological anthropologist Terrence Deacon, in a synthesis of over twenty years of research on human evolution, human neurology, and primatology, describes this "ratcheting effect" as a form of "Baldwinian Evolution." Named after psychologist James Baldwin, this describes a situation in which an animal's behavior has evolutionary consequences when it changes the natural environment and thus the selective forces acting on the animal.

Once some useful behavior spreads within a population and becomes more important for subsistence, it will generate selection pressures on genetic traits that support its propagation ... Stone and symbolic tools, which were initially acquired with the aid of flexible ape-learning abilities, ultimately turned the tables on their users and forced them to adapt to a new niche opened by these technologies. Rather than being just useful tricks, these behavioral prostheses for obtaining food and organizing social behaviors became indispensable elements in a new adaptive complex. The origin of "humanness" can be defined as that point in our evolution where these tools became the principle [*sic*?] source of selection on our bodies and brains. It is the diagnostic of *Homo symbolicus*.

According to Deacon, this occurred between 2 and 2.5 million years ago, when we have the first fossil evidence of stone tool use and the beginning of a trend in an increase in brain size. But it is the evolution of symbolic language which is the cause—and not the effect—of these trends. More specifically, Deacon is suggesting that *Australopithecines*, like contemporary apes, used tools; it is possible that over the millions of years of *Australopithecine* history, many troops developed symbolic communication systems. All that was necessary was that one of these groups so altered their environment that "it introduced selection for very different learning abilities than affected prior species." This troop or population kick-started the Baldwinian process (the "ratchet effect") that led to their evolution to genus *Homo*.

The question for Deacon is what behavioral-environmental changes could have made the development of symbolic thinking adaptive? Here he emphasizes the importance of distinguishing humans from all other species, not to privilege human intelligence but to problematize it. Given that the evolution of *H. sapiens* began with ancestors who did not yet have "culture," what led them to move away from cognitive, learning, communication, and tool-making strategies that were and continued to be adaptive for most other primates (and, some have suggested, most other species of animals)? Learning symbol systems are more time consuming than other forms of communication, so symbolic thought made possible a different communication strategy, but not a more efficient one than other primates. Nevertheless, it must have offered some selective advantage to *H. sapiens* to have evolved. Deacon starts by looking at two key determinants in evolutionary history: foraging behavior, and patterns of sexual relations. As he observes

competition for sexual access limits the possibilities for social cooperation in many species; yet, Deacon observes, there are three consistent patterns in human reproduction that distinguish them from other species:

- 1. Both males and females usually contribute effort towards the rearing of their offspring, though often to differing extents and in very different ways.
- 2. In all societies, the great majority of adult males and females are bound by long-term, exclusive sexual access rights and prohibitions to particular individuals of the opposite sex.
- 3. They maintain these exclusive sexual relations while living in modest to large-sized, multi-male, multi-female, cooperative social groups.

Moreover, there is one feature common to all known human foraging societies (all humans prior to ten or fifteen thousand years ago), and markedly different from other primates: "the use of meat. . . . The appearance of the first stone tools nearly 2.5 million years ago almost certainly correlates with a radical shift in foraging behavior to gain access to meat." Deacon does not believe that symbolic thought was necessary for hunting or tool-making (although tool-making may be a reliable index of symbolic thought); rather, it was necessary for the success of distinctive social relations.

The key is that while men and women are equally effective foragers, mothers carrying dependent children are not effective hunters. They must thus depend on male hunters. This favors a system in which males have exclusive sexual access to females, and females can predict that their sexual partner will provide food for them and their children. In most mammalian species the result is a system of rank or sexual competition that results in either polygyny, or lifelong pair-bonding between two individuals who live relatively independent of other adults of their species; in both cases male aggression plays an important role in maintaining sexual access to mate(s).

Human reliance on resources that are relatively unavailable to females with infants selects not only for cooperation between a child's father and mother but also for the cooperation of other relatives and friends, including elderly individuals and juveniles, who can be relied upon for assistance. The special demands of acquiring meat and caring for infants in our own evolution together contribute to the underlying impetus for the third characteristic feature of human reproductive patterns: cooperative group living.

What is uniquely characteristic about human societies is what required symbolic cognition, which consequently leads to the evolution of culture: "cooperative, mixed-sex social groups, with significant male care and provisioning of offspring, and relatively stable patterns of reproductive exclusion." This combination is relatively rare in other species because it is "highly susceptible to disintegration." Language and culture provide the glue that holds it together.

Chimpanzees also, on occasion, hunt meat; in most cases, however, males consume the meat immediately, and only on occasion share with females who happen to be nearby. Among chimpanzees, hunting for meat increases when other sources of food become scarce, but under these circumstances sharing decreases. The first forms of symbolic thinking made stone tools possible, which in turn made hunting for meat a more dependable source of food for our nonhuman ancestors while making possible forms of social communication that make sharing between males and females, but also among males, decreasing sexual competition:

So the socio-ecological problem posed by the transition to a meat-supplemented subsistence strategy is that it cannot be utilized without a social structure which guarantees unambiguous and exclusive mating and is sufficiently egalitarian to sustain cooperation via shared or parallel reproductive interests. This problem can be solved symbolically.
2.1.6 Archaeology

In the 19th century archaeology was often a supplement to history, and the goal of archaeologists was to identify artifacts according to their typology and stratigraphy, thus marking their location in time and space. Franz Boas established that archaeology is one of American anthropology's four fields, and debates among archaeologists have often paralleled debates among cultural anthropologists. In the 1920s and 1930s, Australian-British archaeologist V. Gordon Childe and American archaeologist W. C. McKern independently began moving from asking about the date of an artifact, to asking about the people who produced it — when archaeologists work alongside historians, historical materials generally help answer these questions, but when historical materials are unavailable, archaeologists had to develop new methods. Childe and McKern focused on analyzing the relationships among objects found together; their work established the foundation for a three-tiered model:

- 1. An individual artifact, which has surface, shape, and technological attributes (e.g. an arrowhead)
- 2. A sub-assemblage, consisting of artifacts that are found, and were likely used, together (e.g. an arrowhead, bow and knife)
- 3. An assemblage of sub-assemblages that together constitute the archaeological site (e.g. the arrowhead, bow and knife; a pot and the remains of a hearth; a shelter)

Childe argued that a "constantly recurring assemblage of artifacts" to be an "archaeological culture." Childe and others viewed "each archaeological culture ... the manifestation in material terms of a specific *people*."

In 1948 Walter Taylor systematized the methods and ideas that archaeologists had developed and proposed a general model for the archaeological contribution to knowledge of cultures. He began with the mainstream understanding of culture as the product of human cognitive activity, and the Boasian emphasis on the subjective meanings of objects as dependent on their cultural context. He defined culture as "a mental phenomenon, consisting of the contents of minds, not of material objects or observable behavior." He then devised a three-tiered model linking cultural anthropology to archeology, which he called conjunctive archaeology:

- 1. Culture, which is unobservable(behavior) and nonmaterial
- 2. Behaviors resulting from culture, which are observable and nonmaterial
- 3. Objectifications, such as artifacts and architecture, which are the result of behavior and material

That is, material artifacts were the material residue of culture, but not culture itself. Taylor's point was that the archaeological record could contribute to anthropological knowledge, but only if archaeologists reconceived their work not just as digging up artifacts and recording their location in time and space, but as inferring from material remains the behaviors through which they were produced and used, and inferring from these behaviors the mental activities of people. Although many archaeologists agreed that their research was integral to anthropology, Taylor's program was never fully implemented. One reason was that his three-tier model of inferences required too much fieldwork and laboratory scrutiny to be practical. Moreover, his view that material remains were not themselves cultural, and in fact twice-removed from culture, in fact left archaeology marginal to cultural anthropology.

In 1962 Leslie White's former student Lewis Binford proposed a new model for anthropological archaeology, called "the New Archaeology" or "Processual Archaeology," based on White's definition of culture as "the extra-somatic means of adaptation for the human organism." This definition allowed Binford to establish archaeology as a crucial field for the pursuit of the methodology of Julian Steward's cultural ecology:

The comparative study of cultural systems with variable technologies in a similar environmental range or similar technologies in differing environments is a major methodology of what Steward (1955: 36–42) has called "cultural ecology," and certainly is a valuable means of increasing our understanding of cultural processes. Such a methodology is also useful in elucidating the structural relationships between major cultural sub-systems such as the social and ideological sub-systems.

In other words, Binford proposed an archaeology that would be central to the dominant project of cultural anthropologists at the time (culture as non-genetic adaptations to the environment); the "new archaeology" was the cultural anthropology (in the form of cultural ecology or ecological anthropology) of the past.

In the 1980s, there was a movement in the United Kingdom and Europe against the view of archeology as a field of anthropology, echoing Radcliffe-Brown's earlier rejection of cultural anthropology. During this same period, then-Cambridge archaeologist Ian Hodder developed "post-processual archaeology" as an alternative. Like Binford (and unlike Taylor) Hodder views artifacts not as objectifications of culture but *as* culture itself. Unlike Binford, however, Hodder does not view culture as an environmental adaptation. Instead, he "is committed to a fluid semiotic version of the traditional culture idea in which material items, artifacts, are full participants in the creation, deployment, alteration, and fading away of symbolic complexes." His 1982 book, *Symbols in Action*, evokes the symbolic anthropology of Geertz, Schneider, with their focus on the context dependent meanings of cultural things, as an alternative to White and Steward's materialist view of culture. In his 1991 textbook, *Reading the Past: Current Approaches to Interpretation in Archaeology* Hodder argued that archaeology is more closely aligned to history than to anthropology.

2.1.7 Language

The connection between culture and language has been noted as far back as the classical period and probably long before. The ancient Greeks, for example, distinguished between civilized peoples and bárbaroi "those who babble", i.e. those who speak unintelligible languages. The fact that different groups speak different, unintelligible languages is often considered more tangible evidence for cultural differences than other less obvious cultural traits.

The German romanticists of the 19th century such as Johann Gottfried Herder and Wilhelm von Humboldt, often saw language not just as one cultural trait among many but rather as the direct expression of a people's national character, and as such as culture in a kind of condensed form.

Franz Boas, founder of American anthropology, like his German forerunners, maintained that the shared language of a community is the most essential carrier of their common culture. Boas was the first anthropologist who considered it unimaginable to study the culture of a foreign people without also becoming acquainted with their language. For Boas, the fact that the intellectual culture of a people was largely constructed, shared and maintained through the use of language, meant that understanding the language of a cultural group was the key to understanding its culture. At the same time, though, Boas and his students were aware that culture and language are not directly dependent on one another. That is, groups with widely different cultures may share a common language, and speakers of completely unrelated languages may share the same fundamental cultural traits. Numerous other scholars have suggested that the form of language determines specific cultural traits. This is similar to the notion of Linguistic determinism, which states that the form of language and culture, some of his intellectual heirs entertained the idea that habitual patterns of speaking and thinking in a particular language may influence the culture of the linguistic group. Such belief is related to the theory of Linguistic relativity. Boas, like most modern

anthropologists, however, was more inclined to relate the interconnectedness between language and culture to the fact that, as B.L. Whorf put it, "they have grown up together".

Indeed, the origin of language, understood as the human capacity of complex symbolic communication, and the origin of complex culture is often thought to stem from the same evolutionary process in early man. Evolutionary anthropologist Robin I. Dunbar has proposed that language evolved as early humans began to live in large communities which required the use of complex communication to maintain social coherence. Language and culture then both emerged as a means of using symbols to construct social identity and maintain coherence within a social group too large to rely exclusively on pre-human ways of building community such as for example grooming. Since language and culture are both in essence symbolic systems, twentieth century cultural theorists have applied the methods of analyzing language developed in the science of linguistics to also analyze culture. Particularly the structural theory of Ferdinand de Saussure which describes symbolic systems as consisting of signs (a pairing of a particular form with a particular meaning) has come to be applied widely in the study of culture. But also poststructuralist theories that nonetheless still rely on the parallel between language and culture as systems of symbolic communication, have been applied in the field of semiotics. The parallel between language and culture can then be understood as analog to the parallel between a linguistic sign, consisting for example of the sound [kau] and the meaning "cow", and a cultural sign, consisting for example of the cultural form of "wearing a crown" and the cultural meaning of "being king". In this way it can be argued that culture is itself a kind of language. Another parallel between cultural and linguistic systems is that they are both systems of practice that is they are a set of special ways of doing things that is constructed and perpetuated through social interactions. Children, for example, acquire language in the same way as they acquire the basic cultural norms of the society they grow up in – through interaction with older members of their cultural group.

However, languages, now understood as the particular set of speech norms of a particular community, are also a part of the larger culture of the community that speak them. Humans use language as a way of signalling identity with one cultural group and different from others. Even among speakers of one language several different ways of using the language exist, and each is used to signal affiliation with particular subgroups within a larger culture. In linguistics such different ways of using the same language are called "varieties". For example, the English language is spoken differently in the USA, the UK and Australia, and even within English-speaking countries there are hundreds of dialects of English that each signals a belonging to a particular region and/or subculture. For example, in the UK the cockney dialect signals its speakers' belonging to the group of lower class workers of east London. Differences between varieties of the same language often consist in different pronunciations and vocabulary, but also sometimes of different grammatical systems and very often using different styles (e.g. cockney Rhyming slang or Lawyers' jargon). Linguists and anthropologists, particularly sociolinguists, ethnolinguists and linguistic anthropologists have specialized in studying how ways of speaking vary between speech communities.

A community's ways of speaking or signing are a part of the community's culture, just as other shared practices are. Language use is a way of establishing and displaying group identity. Ways of speaking function not only to facilitate communication, but also to identify the social position of the speaker. Linguists call different ways of speaking language varieties, a term that encompasses geographically or socioculturally defined dialects as well as the jargons or styles of subcultures. Linguistic anthropologists and sociologists of language define communicative style as the ways that language is used and understood within a particular culture.

The difference between languages does not consist only in differences in pronunciation, vocabulary or grammar, but also in different "cultures of speaking". Some cultures for example have elaborate systems

of "social deixis", systems of signalling social distance through linguistic means. In English, social deixis are shown mostly though distinguishing between addressing some people by first name and others by surname, but also in titles such as "Mrs.", "boy", "Doctor" or "Your Honor", but in other languages such systems may be highly complex and codified in the entire grammar and vocabulary of the language. In several languages of East Asia, for example Thai, Burmese and Javanese, different words are used according to whether a speaker is addressing someone of higher or lower rank than oneself in a ranking system with animals and children ranking the lowest and gods and members of royalty as the highest. Other languages may use different forms of address when speaking to speakers of the opposite gender or in-law relatives and many languages have special ways of speaking to infants and children. Among other groups, the culture of speaking may entail *not speaking* to particular people, for example many indigenous culture's speech is not addressed directly to children. Some languages also require different ways of speaking to different social classes of speakers, and often such a system is based on gender differences, as in Japanese and Koasati.

2.1.8 Cultural anthropology

2.1.8.1 Universal versus particular

The modern anthropological idea of culture had its origins in the 19th century with German anthropologist Adolf Bastian's theory of the "psychic unity of mankind," which, influenced by Herder and von Humboldt, challenged the identification of "culture" with the way of life of European elites, and British anthropologist Edward Burnett Tylor's attempt to define culture as inclusively as possible. Tylor in 1874 described culture in the following way: "Culture or civilization, taken in its wide ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society." Although Tylor was not aiming to propose a general theory of culture (he explained his understanding of culture in the course of a larger argument about the nature of religion), American anthropologists have generally presented their various definitions of culture with the "superorganic," that is, a domain with ordering principles and laws that could not be explained by or reduced to biology. In 1973, Gerald Weiss reviewed various definitions of culture and debates as to their parsimony and power, and proposed as the most scientifically useful definition that "culture" be defined "*as our generic term for all human nongenetic, or metabiological, phenomena*" (italics in the original).

Franz Boas, founded modern American anthropology with the establishment of the first graduate program in anthropology at Columbia University in 1896. At the time the dominant model of culture was that of cultural evolution, which posited that human societies progressed through stages of savagery to barbarism to civilization; thus, societies that for example are based on horticulture and Iroquois kinship terminology are less evolved than societies based on farming and Eskimo kinship terminology. One of Boas's greatest accomplishments was to demonstrate convincingly that this model is fundamentally flawed, empirically, methodologically, and theoretically. Moreover, he felt that our knowledge of different cultures was so incomplete, and often based on unsystematic or unscientific research, that it was impossible to develop any scientifically valid general model of human cultures. Instead, he established the principle of cultural relativism and trained students to conduct rigorous participant observation field research in different societies. Boas understood the capcity for culture to coincide with the evolution of other, biological, features defining genus Homo. Nevertheless, he argued that culture could not be reduced to biology or other expressions of symbolic thought, such as language. Boas and his students understood culture inclusively and resisted developing a general definition of culture. Indeed, they resisted identifying

"culture" as a thing, instead using culture as an adjective rather than a noun. Boas argued that cultural "types" or "forms" are always in a state of flux. His student Alfred Kroeber argued that the "unlimited receptivity and assimilativeness of culture" made it practically impossible to think of cultures as discrete things.

Boas's students dominated cultural anthropology through World War II, and continued to have great influence through the 1960s. They were especially interested in two phenomena: the great variety of forms culture took around the world, and the many ways individuals were shaped by and acted creatively through their own cultures. This led his students to focus on the history of cultural traits: how they spread from one society to another, and how their meanings changed over time—and the life histories of members of other societies. Others, such as Ruth Benedict (1887–1948) and Margaret Mead (1901–1978), produced monographs or comparative studies analyzing the forms of creativity possible to individuals within specific cultural configurations. Essential to their research was the idea of "context": culture provided a context that made the behavior of individuals understandable; geography and history provided a context for understanding the differences between cultures. Thus, although Boasians were committed to the belief in the psychic unity of humankind and the universality of culture, their emphasis on local context and cultural diversity led them away from proposing cultural universals or universal theories of culture.

There is a tension in cultural anthropology between the claim that culture is a universal (the fact that all human societies have culture), and that it is also particular (culture takes a tremendous variety of forms around the world). Since Boas, two debates have dominated cultural anthropology. The first has to do with ways of modeling particular cultures. Specifically, anthropologists have argued as to whether "culture" can be thought of as a bounded and integrated thing, or as a quality of a diverse collection of things, the numbers and meanings of which are in constant flux. Boas's student Ruth Benedict suggested that in any given society cultural traits may be more or less "integrated," that is, constituting a pattern of action and thought that gives purpose to people's lives, and provides them with a basis from which to evaluate new actions and thoughts, although she implies that there are various degrees of integration; indeed, she observes that some cultures fail to integrate. Boas, however, argued that complete integration is rare and that a given culture only appears to be integrated because of observer bias. For Boas, the appearance of such patterns—a national culture, for example—was the effect of a particular point of view.

The first debate was effectively suspended in 1934 when Ruth Benedict published *Patterns of Culture*, which has continuously been in print. Although this book is well known for popularizing the Boasian principle of cultural relativism, among anthropologists it constituted both an important summary of the discoveries of Boasians, and a decisive break from Boas's emphasis on the mobility of diverse cultural traits. "Anthropological work has been overwhelmingly devoted to the scrutiny of cultural traits," she wrote "rather than to the study of cultures as articulated wholes." Influenced by Polish-British social anthropologist Bronisław Malinowski, however, she argued that "The first essential, so it seems today, is to study the living culture, to know its habits of thought and the functions of its institutions" and that "the only way in which we can know the significance of the selected detail of behavior is against the background of the motives and emotions and values that are institutionalized in that culture." Influenced by German historians Wilhelm Dilthey and Oswald Spengler, as well as by gestalt psychology, she argued that "the whole determines its parts, not only their relation but their very nature," and that "cultures, likewise, are more than the sum of their traits." Just as each spoken language draws very selectively from an extensive, but finite, set of sounds any human mouth (free from defect) can make, she concluded that in each society people, over time and through both conscious and unconscious processes, selected from an extensive but finite set of cultural traits which then combine to form a unique and distinctive pattern."

The significance of cultural behavior is not exhausted when we have clearly understood that it is local and man-made and hugely variable. It tends to be integrated. A culture, like an individual, is a more or less consistent pattern of thought and action. Within each culture there come into being characteristic purposes not necessarily shared by other types of society. In obedience to their purposes, each people further and further consolidate its experience, and in proportion to the urgency of these drives the heterogeneous items of behavior take more and more congruous shape. Taken up by a well-integrated culture, the most ill-assorted acts become characteristic of its particular goals, often by the most unlikely metamorphoses.

Although Benedict felt that virtually all cultures are patterned, she argued that these patterns change over time as a consequence of human creativity, and therefore different societies around the world had distinct characters. *Patterns of Culture* contrasts Zuňi, Dobu and Kwakiutl cultures as a way of highlighting different ways of being human. Benedict observed that many Westerners felt that this view forced them to abandon their "dreams of permanence and ideality and with the individual's illusions of autonomy" and that for many, this made existence "empty." She argued however that once people accepted the results of scientific research, people would "arrive then at a more realistic social faith, accepting as grounds of hope and as new bases for tolerance the coexisting and equally valid patterns of life which mankind has created for itself from the raw materials of existence."

This view of culture has had a tremendous impact outside of anthropology, and dominated American anthropology until the Cold War, when anthropologists like Sidney Mintz and Eric Wolf rejected the validity and value of approaching "each culture" as "a world in itself" and "relatively stable." They felt that, too often, this approach ignored the impact of imperialism, colonialism, and the world capitalist economy on the peoples Benedict and her followers studied (and thus re-opened the debate on the relationship between the universal and the particular, in the form of the relationship between the global and the local). In the meantime, its emphasis on metamorphosing patterns influenced French structuralism and made American anthropologists receptive to British structural-functionalism.

The second debate has been over the ability to make universal claims about all cultures. Although Boas argued that anthropologists had yet to collect enough solid evidence from a diverse sample of societies to make any valid general or universal claims about culture, by the 1940s some felt ready. Whereas Kroeber and Benedict had argued that "culture"—which could refer to local, regional, or trans-regional scales—was in some way "patterned" or "configured," some anthropologists now felt that enough data had been collected to demonstrate that it often took highly structured forms. The question these anthropologists debated was, were these structures statistical artifacts, or where they expressions of mental models? This debate emerged full-fledged in 1949, with the publication of George Murdock's *Social Structure*, and Claude Lévi-Strauss's *Les Structures Élémentaires de la Parenté*.

Opposing Boas and his students was a Yale anthropologist George Murdock, who compiled the Human Relations Region Files. These files code cultural variables found in different societies, so that anthropologists can use statistical methods to study correlations among different variables. The ultimate aim of this project is to develop generalizations that apply to increasingly larger numbers of individual cultures. Later, Murdock and Douglas R. White developed the standard cross-cultural sample as a way to refine this method.

French anthropologist Claude Lévi-Strauss's structuralist anthropology brought together ideas of Boas (especially Boas's belief in the mutability of cultural forms, and Bastian's belief in the psychic unity of humankind) and French sociologist's Émile Durkheim's focus on social structures (institutionalized relationships among persons and groups of persons). Instead of making generalizations that applied to large numbers of societies, Lévi-Strauss sought to derive from concrete cases increasingly abstract models of human nature. His method begins with the supposition that culture exists in two different forms: the

many distinct structures that could be inferred from observing members of the same society interact (and of which members of a society are themselves aware), and abstract structures developed by analyzing shared ways (such as myths and rituals) members of a society represent their social life (and of which members of a society are not only *not* consciously aware, but which moreover typically stand in opposition to, or negate, the social structures of which people *are* aware). He then sought to develop one universal mental structure that could only be inferred through the systematic comparison of particular social and cultural structures. He argued that just as there are laws through which a finite and relatively small number of chemical elements could be combined to create a seemingly infinite variety of things, there were a finite and relatively small number of cultural elements which people combine to create the great variety of cultures anthropologists observe. The systematic comparison of societies would enable an anthropologist to analyze specific cultures and achieve insights hidden to the very people who produced and lived through these cultures. Structuralism came to dominate French anthropology and, in the late 1960s and 1970s, came to have great influence on American and British anthropology.

Murdock's HRAF and Lévi-Strauss's structuralism provide two ambitious ways to seek the universal in the particular, and both approaches continue to appeal to different anthropologists. However, the differences between them reveal a tension implicit in the heritage of Tylor and Bastian. Is culture to be found in empirically observed behaviors that may form the basis of generalizations? Or does it consist of universal mental processes, which must be inferred and abstracted from observed behavior? This question has driven debates among biological anthropologists and archeologists as well.

2.1.9 Structural functionalism

In structural functionalism, as a social theory, society is viewed as "a reality of structural and cultural components or "facts" that can be investigated". Thus in the 1940s the Boasian understanding of culture was challenged by that new paradigm for anthropological and social science research. This paradigm developed independently but in parallel in both the United Kingdom and in the United States (In both cases it is *sui generis*: it has no direct relationship to "structuralism" except that both French structuralism and Anglo-American Structural-Functionalism were all influenced by Durkheim. It is also analogous, but unrelated to, other forms of "functionalism"). Whereas the Boasians viewed anthropology as that natural science dedicated to the study of humankind, structural functionalists viewed anthropology as one social science among many, dedicated to the study of one specific facet of humanity. This led structural-functionalists to redefine and minimize the scope of "culture."

In the United Kingdom, the creation of structural functionalism was anticipated by Raymond Firth's (1901–2002) *We the Tikopia*, published in 1936, and marked by the publication of *African Political Systems*, edited by Meyer Fortes (1906–1983) and E.E. Evans-Pritchard (1902–1973) in 1940. In these works these anthropologists forwarded a synthesis of the ideas of their mentor, Bronisław Malinowski (1884–1942), and his rival, A. R. Radcliffe-Brown (1881–1955). Both Malinowski and Radcliffe-Brown viewed anthropology—what they call "social anthropology"—as that branch of sociology that studied so-called primitive societies. According to Malinowski's theory of functionalism, all human beings have certain biological needs, such as the need for food and shelter, and humankind has the biological need to reproduce. Every society develops its own institutions, which function to fulfill these needs. In order for these institutions to function, individuals take on particular social roles that regulate how they act and interact. Although members of any given society may not understand the ultimate functions of their roles and institutions, an ethnographer can develop a model of these functions through the careful observation of social life. Radcliffe-Brown rejected Malinowski's notion of function, and believed that a general theory of primitive social life could only be built up through the careful comparison of different societies.

Influenced by the work of French sociologist Émile Durkheim (1858–1917), who argued that primitive and modern societies are distinguished by distinct social structures, Radcliffe-Brown argued that anthropologists first had to map out the social structure of any given society before comparing the structures of different societies. Firth, Fortes, and Evans-Pritchard found it easy to combine Malinowski's attention to social roles and institutions with Radcliffe-Brown's concern with social structures. They distinguished between "social organization" (observable social interactions) and "social structure" (rule-governed patterns of social interaction), and shifted their attention from biological functions to social functions. For example, how different institutions are functionally integrated, and the extent to, and ways in, which institutions function to promote social solidarity and stability. In short, instead of culture (understood as all human non-genetic or extra-somatic phenomena) they made "sociality" (interactions and relationships among persons and groups of people) their object of study. (Indeed, Radcliffe-Brown once wrote "I should like to invoke a taboo on the word *culture*.")

Coincidentally, in 1946 sociologist Talcott Parsons (1902–1979) founded the Department of Social Relations at Harvard University. Influenced by such European sociologists as Émile Durkheim and Max Weber, Parsons developed a theory of social action that was closer to British social anthropology than to Boas's American anthropology, and which he also called "structural functionalism." The parson's intention was to develop a total theory of social action (why people act as they do), and to develop at Harvard an interdisciplinary program that would direct research according to this theory. His model explained human action as the result of four systems:

- 1. The "behavioral system" of biological needs
- 2. The "personality system" of an individual's characteristics affecting their functioning in the social world
- 3. The "social system" of patterns of units of social interaction, especially social status and role
- 4. The "cultural system" of norms and values that regulate social action symbolically

According to this theory, the second system was the proper object of study for psychologists; the third system for sociologists, and the fourth system for cultural anthropologists. Whereas the Boasians considered all of these systems to be objects of study by anthropologists, and "personality" and "status and role" to be as much a part of "culture" as "norms and values," Parsons envisioned a much narrower role for anthropology and a much narrower definition of culture.

Although Boasian cultural anthropologists were interested in norms and values, among many other things, it was only with the rise of structural functionalism that people came to identify "culture" with "norms and values." Many American anthropologists rejected this view of culture (and by implication, anthropology). In 1980, anthropologist Eric Wolf wrote,

As the social sciences transformed themselves into "behavioral" science, explanations for behavior were no longer traced to culture: behavior was to be understood in terms of psychological encounters, strategies of economic choice, strivings for payoffs in games of power. Culture, once extended to all acts and ideas employed in social life, was now relegated to the margins as "world view" or "values".

Nevertheless, several of Talcott Parsons' students emerged as leading American anthropologists. At the same time, many American anthropologists had a high regard for the research produced by social anthropologists in the 1940s and 1950s, and found structural-functionalism to provide a very useful model for conducting ethnographic research.

The combination of American cultural anthropology theory with British social anthropology methods has led to some confusion between the ideas of "society" and "culture." For most anthropologists, these are

distinct ideas. Society refers to a group of people; culture refers to a pan-human capacity and the totality of non-genetic human phenomena. Societies are often clearly bounded; cultural traits are often mobile, and cultural boundaries, such as they are, can be typically porous, permeable, and plural. During the 1950s and 1960s anthropologists often worked in places where social and cultural boundaries coincided, thus obscuring the distinction. When disjunctures between these boundaries become highly salient, for example during the period of European de-colonization of Africa in the 1960s and 1970s, or during the post-Bretton Woods realignment of globalization, however, the difference often becomes central to anthropological debates.

2.1.10 Symbolic versus adaptive

Parsons' students Clifford Geertz and David M. Schneider, and Schneider's student Roy Wagner, went on to important careers as cultural anthropologists and developed a school within American cultural anthropology called "symbolic anthropology," the study of the social construction and social effects of symbols. Since symbolic anthropology easily complemented social anthropologists' studies of social life and social structure, many British structural-functionalists (who rejected or were uninterested in Boasian cultural anthropology) accepted the Parsonian definition of "culture" and "cultural anthropology." British anthropologist Victor Turner (who eventually left the United Kingdom to teach in the United States) was an important bridge between American and British symbolic anthropology.

Attention to symbols, the meaning of which depended almost entirely on their historical and social context, appealed to many Boasians. Leslie White asked about cultural things, "What sort of objects are they? Are they physical objects? Mental objects? Both? Metaphors? Symbols? In *Science of Culture* (1949), he concluded that they are objects "*sui generis*"; that is, of their own kind. In trying to define that kind, he hit upon a previously unrealized aspect of symbolization, which he called "the symbolate"—an object created by the act of symbolization. He thus defined culture as "symbolates understood in an extrasomatic context."

Nevertheless, by the 1930s White began turning away from the Boasian approach. He wrote,

In order to live man, like all other species, must come to terms with the external world.... Man employs his sense organs, nerves, glands, and muscles in adjusting himself to the external world. But in addition to this he has another means of adjustment and control.... This mechanism is *culture*.

Although this view echoes that of Malinowski, the key idea for White was not "function" but "adaptation." Whereas the Boasians were interested in the history of specific traits, White was interested in the cultural history of the human species, which he felt should be studied from an evolutionary perspective. Thus, the task of anthropology is to study "not only how culture evolves, but why as well.... In the case of man ... the power to invent and to discover, the ability to select and use the better of two tools or ways of doing something— these are the factors of cultural evolution." Unlike 19th century evolutionists, who were concerned with how civilized societies rose above primitive societies, White was interested in documenting how, over time, humankind as a whole has through cultural means discovered more and more ways for capturing and harnessing energy from the environment, in the process transforming culture.

At the same time that White was developing his theory of cultural evolution, Kroeber's student Julian Steward was developing his theory of cultural ecology. In 1938 he published *Basin-Plateau Aboriginal Socio-Political Groups* in which he argued that diverse societies—for example the indigenous Shoshone or White farmers on the Great Plains—were not less or more evolved; rather, they had adapted differently to different environments. Whereas Leslie White was interested in culture understood holistically as a

property of the human species, Julian Steward was interested in culture as the property of distinct societies. Like White he viewed culture as a means of adapting to the environment, but he criticized Whites "unilineal" (one direction) theory of cultural evolution and instead proposed a model of "multilineal" evolution in which (in the Boasian tradition) each society has its own cultural history.

When Julian Steward left a teaching position at the University of Michigan to work in Utah in 1930, Leslie White took his place; in 1946 Julian Steward was made Chair of the Columbia University Anthropology Department. In the 1940s and 1950s their students, most notably Marvin Harris, Sidney Mintz, Robert Murphy, Roy Rappaport, Marshall Sahlins, Elman Service, Andrew P. Vayda and Eric Wolf dominated American anthropology. Most promoted materialist understandings of culture in opposition to the symbolic approaches of Geertz and Schneider. Harris, Rappaport, and Vayda were especially important for their contributions to cultural materialism and ecological anthropology, both of which argued that "culture" constituted an extra-somatic (or non-biological) means through which human beings could adapt to life in drastically differing physical environments.

The debate between symbolic and materialist approaches to culture dominated American Anthropologists in the 1960s and 1970s. The Vietnam War and the publication of Dell Hymes' *Reinventing Anthropology*, however, marked a growing dissatisfaction with the then dominant approaches to culture. Hymes argued that fundamental elements of the Boasian project such as holism and an interest in diversity were still worth pursuing: "interest in other peoples and their ways of life, and concern to explain them within a frame of reference that includes ourselves." Moreover, he argued that cultural anthropologists are singularly well-equipped to lead this study (with an indirect rebuke to sociologists like Parsons who sought to subsume anthropology to their own project):

In the practice there is a traditional place for openness to phenomena in ways not predefined by theory or design – attentiveness to complex phenomena, to phenomena of interest, perhaps aesthetic, for their own sake, to the sensory as well as intellectual, aspects of the subject. These comparative and practical perspectives, though not unique to formal anthropology, are specially husbanded there, and might well be impaired, if the study of man were to be united under the guidance of others who lose touch with experience in concern for methodology, who forget the ends of social knowledge in elaborating its means, or who are unwittingly or unconcernedly culture-bound.

It is these elements, Hymes argued, that justify a "general study of man," that is, "anthropology".

During this time notable anthropologists such as Mintz, Murphy, Sahlins, and Wolf eventually broke away, experimenting with structuralist and Marxist approaches to culture, they continued to promote cultural anthropology against structural functionalism.

2.1.11 Local versus global

Boas and Malinowski established ethnographic research as a highly localized method for studying culture. Yet Boas emphasized that culture is dynamic, moving from one group of people to another, and that specific cultural forms have to be analyzed in a larger context. This has led anthropologists to explore different ways of understanding the global dimensions of culture.

In the 1940s and 1950s, several key studies focused on how trade between indigenous peoples and the Europeans who had conquered and colonized the Americas influenced indigenous culture, either through changes in the organization of labor, or change in critical technologies. Bernard Mishkin studied the effect of the introduction of horses on Kiowa political organization and warfare. Oscar Lewis explored the influence of the fur trade on Blackfoot culture (relying heavily on historical sources). Joseph Jablow

documented how Cheyenne social organization and subsistence strategy between 1795 and 1840 were determined by their position in trade networks linking Whites and other Indians. Frank Secoy argued that Great Plains Indians' social organization and military tactics changed as horses, introduced by the Spanish in the south, diffused north, and guns, introduced by the British and French in the east, diffused west.

In the 1950s Robert Redfield and students of Julian Steward pioneered "community studies," namely, the study of distinct communities (whether identified by race or economic class) in Western or "Westernized" societies, especially cities. They thus encountered the antagonisms 19th century critics described using the terms "high culture" and "low culture." These 20th-century anthropologists struggled to describe people who were politically and economically inferior but not, they believed, culturally inferior. Oscar Lewis proposed the idea of a "culture of poverty" to describe the cultural mechanisms through which people adapted to a life of economic poverty. Other anthropologists and sociologists began using the term "sub-culture" to describe culturally distinct communities that were part of larger societies.

One important kind of subculture is that formed by an immigrant community. In dealing with immigrant groups and their cultures, there are various approaches:

- Leitkultur (core culture): A model developed in Germany by Bassam Tibi. The idea is that minorities can have an identity of their own, but they should at least support the core ideas of the culture on which the society is based.
- Melting Pot: In the United States, the traditional view has been one of a melting pot where all the immigrant cultures are mixed and amalgamated without state intervention.
- Monoculturalism: In some European states, culture is very closely linked to nationalism, thus government policy is to assimilate immigrants, although recent increases in the movement have led many European states to experiment with forms of multiculturalism.
- Multiculturalism: A policy that immigrants and others should preserve their cultures with the different cultures interacting peacefully within one nation.

The way nation states treat immigrant cultures rarely falls neatly into one or another of the above approaches. The degree of difference with the host culture (i.e., "foreignness"), the number of immigrants, attitudes of the resident population, the type of government policies that are enacted, and the effectiveness of those policies all makes it difficult to generalize about the effects. Similarly with other subcultures within a society, attitudes of the mainstream population and communications between various cultural groups play a major role in determining outcomes. The study of cultures within a society is complex and research must take into account a myriad of variables.

2.1.12 Sociology

The sociology of culture concerns culture—usually understood as the ensemble of symbolic codes used by a society —as it manifests in society. For Georg Simmel, **culture** referred to "the cultivation of individuals through the agency of external forms which have been objectified in the course of history". Culture in the sociological field can be defined as the ways of thinking, the ways of acting, and the material objects that together shape a people's way of life. Culture can be any of two types, non-material culture or material culture.

Cultural sociology first emerged in Weimar Germany, where sociologists such as Alfred Weber used the term *Kultursoziologie* (cultural sociology). Cultural sociology was then "reinvented" in the English-speaking world as a product of the "cultural turn" of the 1960s, which ushered in structuralist and postmodern approaches to social science. This type of cultural sociology may loosely be regarded as an approach incorporating cultural scrutiny and critical theory. Cultural sociologists tend to reject scientific

methods, instead hermeneutically focusing on words, artifacts and symbols. "Culture" has since become an important idea across many branches of sociology, including resolutely scientific fields like social stratification and social network scrutiny. As a result, there has been a recent influx of quantitative sociologists to the field. Thus there is now a growing group of sociologists of culture who are, confusingly, not cultural sociologists. These scholars reject the abstracted postmodern aspects of cultural sociology, and instead look for a theoretical backing in the more scientific vein of social psychology and cognitive science. "Cultural sociology" is one of the largest sections of the American Sociological Association. The British establishment of cultural studies means the latter is often taught as a looselydistinct discipline in the UK.

2.1.12 Early researchers and development of cultural sociology

The sociology of culture grew from the intersection between sociology, as shaped by early theorists like Marx, Durkheim, and Weber, and with the growing discipline of anthropology where researchers pioneered ethnographic strategies for describing and analyzing a variety of cultures around the world. Part of the legacy of the early development of the field is still felt in the methods (much of the cultural sociological research is qualitative) in the theories (a variety of critical approaches to sociology are central to current research communities) and substantive focus of the field. For instance, relationships between popular culture, political control, and social class were early and lasting concerns in the field.

2.1. 13 Cultural studies

In the United Kingdom, sociologists and other scholars influenced by Marxism, such as Stuart Hall and Raymond Williams, developed Cultural Studies. Following nineteenth century Romantics, they identified "culture" with consumption goods and leisure activities (such as art, music, film, food, sports, and clothing). Nevertheless, they understood patterns of consumption and leisure to be determined by relations of production, which led them to focus on class relations and the organization of production. In the United States, "Cultural Studies" focuses largely on the study of popular culture, that is, the social meanings of mass-produced consumer and leisure goods. The term was coined by Richard Hoggart in 1964 when he founded the Birmingham Centre for Contemporary Cultural Studies or CCCS. It has since become strongly associated with Stuart Hall, who succeeded Hoggart as Director. Cultural studies in this sense, then, can be viewed as a limited concentration scoped on the intricacies of consumerism, which belongs to a wider culture sometimes referred to as "Western Civilization," or "Globalism."

From the 1970s onward, Stuart Hall's pioneering work, along with his colleagues Paul Willis, Dick Hebdige, Tony Jefferson, and Angela McRobbie, created an international intellectual movement. As the field developed it began to combine political economy, communication, sociology, social theory, literary theory, media theory, film/video studies, cultural anthropology, philosophy, museum studies and art history to study cultural phenomena or cultural texts. In this field researchers often concentrate on how particular phenomena relate to matters of ideology, nationality, social class, and/or gender. Cultural studies is concerned with the meaning and practices of everyday life. These practices comprise the ways people do particular things (such as watching television, or eating out) in a given culture. This field studies the meanings and uses people attribute to various objects and practices. Specifically, culture involves those meanings and practices held independently of reason. Watching television in order to view a public perspective on a historical event should not be thought of as culture, unless referring to the medium of television itself, which may have been selected culturally; however, schoolchildren watching television after school with their friends in order to "fit in" certainly qualifies, since there is no grounded reason for one's participation in this practice. Recently, as capitalism has spread throughout the world (a process called globalization), cultural studies has begun to analyze local and global forms of resistance to Western hegemony.

In the context of cultural studies, the idea of a *text* not only includes written language, but also films, photographs, fashion or hairstyles: the texts of cultural studies comprise all the meaningful artifacts of culture. Similarly, the discipline widens the idea of "culture". "Culture" for a cultural studies researcher not only includes traditional high culture (the culture of ruling social groups) and popular culture, but also everyday meanings and practices. The last two, in fact, have become the main focus of cultural studies. A further and recent approach is comparative cultural studies, based on the discipline of comparative literature and cultural studies.

Scholars in the United Kingdom and the United States developed somewhat different versions of cultural studies after the field's inception in the late 1970s. The British version of cultural studies was developed in the 1950s and 1960s mainly under the influence first of Richard Hoggart, E. P. Thompson, and Raymond Williams, and later Stuart Hall and others at the Centre for Contemporary Cultural Studies at the University of Birmingham. This included overtly political, left-wing views, and criticisms of popular culture as 'capitalist' mass culture; it absorbed some of the ideas of the Frankfurt School critique of the "culture industry" (i.e. mass culture).

Whereas in the United States Lindlof & Taylor said, "Cultural studies [were] grounded in a pragmatic, liberal-pluralist tradition". The American version of cultural studies initially concerned itself more with understanding the subjective and appropriative side of audience reactions to, and uses of, mass culture; for example, American cultural-studies advocates wrote about the liberatory aspects of fandom. The distinction between American and British strands, however, has faded. Some researchers, especially in early British cultural studies, apply a Marxist model to the field. This strain of thinking has some influence from the Frankfurt School, but especially from the structuralist Marxism of Louis Althusser and others. The main focus of an orthodox Marxist approach concentrates on the production of meaning. This model assumes a mass production of culture and identifies power as residing with those producing cultural artifacts. In a Marxist view, those who control the means of production (the economic base) essentially control a culture. Other approaches to cultural studies, such as feminist cultural studies and later American developments of the field, distance themselves from this view. They criticize the Marxist assumption of a single, dominant meaning, shared by all, for any cultural product. The non-Marxist approaches suggest that different ways of consuming cultural artifacts affect the meaning of the product. This view is best exemplified by the book Doing Cultural Studies: The Case of the Sony Walkman (by Paul du Gay et al.), which seeks to challenge the notion that those who produce commodities control the meanings that people attribute to them. Feminist cultural analyst, theorist and art historian Griselda Pollock contributed to cultural studies from viewpoints of art history and psychoscrutiny . The writer Julia Kristeva is influential voices in the turn of the century, contributing to cultural studies from the field of art and psychoanalytical French feminism.

2.2 Cultural Differences

The progression towards cultural understanding is vital to becoming an effective volunteer. As humanitarian entrepreneur Connie Duckworth observes, "It's very hard to just parachute into a developing country. There are so many cultural nuances and ethnic differences, so many things about a particular culture that wouldn't be readily apparent to someone who's not from there. The success or failure of projects or enterprises rests on creating solutions that work within that cultural context."(1) Culturally sensitive volunteering requires a willingness to learn as well as to give, but most of all, it requires the humility and the ability to self-evaluate.

Overcoming ethnocentrism involves more than "getting used to" cultural differences. After having been raised in one culture, sudden immersion in a different culture can trigger a series of complex emotions and reactions. For some, it can come as a shock that their worldview isn't universal, but is instead just one

of many equally valid worldviews. For others, fundamental differences among people from different backgrounds can be difficult to accept. Still others will immediately admire the "beautiful" and "exotic" characteristics of a foreign culture, and may even temporarily shun their own background. Regardless of your initial attitude towards cultural differences, it is important to develop genuine intercultural sensitivity in order to be an effective volunteer.

2.2.1 The Developmental Model of Intercultural Sensitivity

Intercultural development and communication expert Dr. Milton Bennett has been recognized for his Developmental Model of Intercultural Sensitivity. The model describes, in a series of six stages, a continuum of attitudes toward cultural differences. The goal is to move from the ethnocentric stages of denial, defense, and minimization, to the ethnorelative stages of acceptance, adaptation and integration. Bennett describes ethnocentrism as an attitude or mindset which presumes the superiority of one's own worldview, sometimes without even acknowledging the existence of others. Ethnorelativism, on the other hand, assumes the equality and validity of all groups and does not judge others by the standards of one's own culture. Bennett's six-stage model is summarized below.

Ethnocentrism: A simple way to conceive of the three stages of ethnocentrism is in terms of attitudes toward cultural differences: those in the denial stage deny the existence of cultural differences, those in the defense stage demonize them, and those in the minimization stage trivialize differences.

Denial: People in the denial stage do not recognize the existence of cultural differences. They are completely ethnocentric in that they believe there is a correct type of living (theirs), and that those who behave differently simply don't know any better. In this phase, people are prone to imposing their value system upon others, believing that they are "right" and that others who are different are "confused." They are not threatened by cultural differences because they refuse to accept them. Generally, those who experience cultural denial have not had extensive contact with people different from themselves, and thus have no experiential basis for believing in other cultures. A key indicator of the denial stage is the belief that you know better than the locals.

Defense: Those on the defense stage are no longer blissfully ignorant of other cultures; they recognize the existence of other cultures, but not their validity. They feel threatened by the presence of other ways of thinking, and thus denigrate them in an effort to assert the superiority of their own culture. Cultural differences are seen as problems to be overcome, and there is a dualistic "us vs. them" mentality. Whereas those in the denial stage are unthreatened by the presence of other cultural value systems (they don't believe in them, after all), those in the defense stage do feel threatened by "competing" cultures. People in the defense stage tend to surround themselves with members of their own culture, and avoid contact with members of other cultures.

Minimization: People in the minimization stage of ethnocentrism are still threatened by cultural differences and try to minimize them by telling themselves that people are more similar than dissimilar. No longer do they see those from other cultures as being misguided, inferior, or unfortunate. They still have not developed cultural self-awareness and are insistent about getting along with everyone. Because they assume that all cultures are fundamentally similar, people in this stage fail to tailor their approaches to a cultural context.

2.2.2 Ethnorelativism

Acceptance: In this first stage of ethnorelativism, people begin to recognize other cultures and accept them as viable alternatives to their own worldview. They know that people are genuinely different from

them and accept the inevitability of other value systems and behavioral norms. They have not yet adapted their own behavior to the cultural context, but they no longer see other cultures as threatening, wrong, or inferior. People in the acceptance phase can be thought of as "culture-neutral," seeing differences as neither good nor bad, but rather as a fact of life.

Adaptation: During the adaptation phase, people begin to view cultural differences as a valuable resource. Because differences are seen as positive, people consciously adapt their behavior to the different cultural norms of their environment.

Integration: Integration is the last stage in one's journey away from ethnocentrism. In this stage, people accept that their identity is not based in any single culture. Once integrated, people can effortlessly and even unconsciously shift between worldviews and cultural frames of reference. Though they maintain their own cultural identity, they naturally integrate aspects of other cultures into it.

Once you have progressed to an ethnorelativistic view of cultural differences, you will in essence be bicultural. You will revel in cultural differences, and be able to effortlessly take on subtle characteristics of the local culture. Your intercultural sensitivity will also affect how others view and treat you. Being trusted and accepted by local people in a culture you have recently come to know and accept will be thrilling and fulfilling, and will allow you to be a more effective volunteer.

2.3 Cultural Landscapes and Cultural Identity

2.3.1 Cultural landscape

Cultural landscapes have been defined by the World Heritage Committee as "cultural properties ... represent[ing] the combined works of nature and of man".

The World Heritage Committee has identified and adopted three categories of cultural landscape, ranging from (i) those landscapes most deliberately 'shaped' by the people, through (ii) full range of 'combined' works, to (iii) those least evidently 'shaped' by people (yet highly valued). The three categories extracted from the Committee's Operational Guidelines, are as follows:

- 1. "A landscape designed and created intentionally by man"
- 2. An "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape"
- 3. An "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element"

2.3.1.1 History of the idea

The idea of 'cultural landscapes' can be found in the European tradition of landscape painting. From the 16th century onwards, many European artists painted landscapes in favor of people, diminishing the people in their paintings with figures subsumed within broader, regionally specific landscapes.

The word "landscape" itself combines 'land' with a verb of Germanic origin, "*scapjan/ schaffen*" to mean, literally, 'shaped lands'. Lands were then regarded to have been shaped by natural forces, and the unique details of such *landshaffen* (shaped lands) became themselves the subject of 'landscape' paintings.

The geographer Otto Schlüter is credited with having first formally used "cultural landscape" as an academic term in the early 20th century. In 1908, Schlüter argued that by defining geography as a *Landschaftskunde* (landscape science) this would give geography a logical subject matter shared by no other discipline. He defined two forms of landscape: the *Urlandschaft* (transl. original landscape) or landscape that existed before major human induced changes and the *Kulturlandschaft* (transl. 'cultural landscape') a landscape created by human culture. The major task of geography was to trace the changes in these two landscapes.

It was Carl O. Sauer, a human geographer, who was probably the most influential in promoting and developing the idea of cultural landscapes. Sauer was determined to stress the agency of culture as a force in shaping the visible features of the Earth's surface in delimited regions. Within his definition, the physical environment retains a central significance, as the medium with and through which human cultures act. His classic definition of a 'cultural landscape' reads as follows:

"The cultural landscape is fashioned from a natural landscape by a cultural group. Culture is the agent, the natural region is the medium, the cultural landscape is the result"

For Schlüter's first formal use of the term, and Sauer's effective promotion of the idea, the idea of 'cultural landscapes has been variously used, applied, debated, developed and refined within academia, when, in 1992, the World Heritage Committee elected to convene a meeting of the 'specialists' to advise and assist redraft the Committee's Operational Guidelines to include 'cultural landscapes' as an option for heritage listed properties that were neither purely natural nor purely cultural in form (i.e. 'mixed' heritage).

The World Heritage Committee's adoption and use of the idea of 'cultural landscapes' has seen multiple specialists around the world, and many nations identifying 'cultural landscapes', assessing 'cultural landscapes', heritage listing 'cultural landscapes', managing 'cultural landscapes', and effectively making 'cultural landscapes' known and visible to the world, with very practical ramifications and challenges.

A 2006 academic review of the combined efforts of the World Heritage Committee, multiple specialists around the world, and nations to apply the idea of 'cultural landscapes', observed and concluded that:

"Although the idea of landscape has been unhooked for some time from its original art associations. There is still a dominant view of landscapes as an inscribed surface, akin to a map or a text, from which cultural meaning and social forms can simply read."

Within academia, any system of interaction between human activity and natural habitat is regarded as a cultural landscape. In a sense this understanding is broader than the definition applied within UNESCO, including, as it does, almost the whole of the world's occupied surface, plus almost all the uses, ecologies, interactions, practices, beliefs, ideas, and traditions of people living within cultural landscapes.

Some Universities now offer specialist degrees in the study of cultural landscapes, including, for instance, the Universities of Naples, St.-Étienne, and Stuttgart who offer a Master of Cultural Landscapes diploma.

2.3.1.2 Examples

The World Heritage Committee has identified and listed a number of regions or properties as cultural landscapes of universal value to humankind, including the following:

2.3.1.2.1 Tongariro National Park, New Zealand (1993)

"In 1993 Tongariro became the first property to be inscribed on the World Heritage List under the revised criteria describing cultural landscapes. The mountains at the heart of the park have cultural and religious significance for the Maori people and symbolize the spiritual links between this community and its environment. The park has active and extinct volcanoes, a diverse range of ecosystems and some spectacular landscapes."

2.3.1.2.2 Uluru-Kata Tjuta National Park, Australia (1994)

"This park, formerly called Uluru (Ayers Rock – Mount Olga) National Park, features spectacular geological formations that dominate the vast red sandy plain of central Australia. Uluru, an immense monolith, and Kata Tjuta, the rock domes located west of Uluru, form part of the traditional belief system of one of the oldest human societies in the world. The traditional owners of Uluru-Kata Tjuta are the Anangu Aboriginal people."

2.3.1.2.3 Rice Terraces of Philippine Cordilleras (1995)

"For 2,000 years, the high rice fields of the Ifugao have followed the contours of the mountains. The fruit of knowledge handed down from one generation to the next, and the expression of sacred traditions and a delicate social balance, they have helped to create a landscape of great beauty that expresses the harmony between humankind and the environment."

2.3.1.2.4 Cultural Landscape of Sintra Portugal (1995)

"In the 19th century Sintra became the first center of European Romantic architecture. Ferdinand II turned a ruined monastery into a castle where this new sensitivity was displayed in the use of Gothic, Egyptian, Moorish and Renaissance elements and in the creation of a park blending local and exotic species of trees. Other fine dwellings, built along the same lines in the surrounding serra, created a unique combination of parks and gardens which influenced the development of landscape architecture throughout Europe".

2.3.1.2.5 Portovenere, Cinque Terre, and the Islands (Palmaria, Tino and Tinetto), Italy (1997)

"The Ligurian coast between Cinque Terre and Portovenere is a cultural landscape of great scenic and cultural value. The layout and disposition of the small towns and the shaping of the surrounding landscape, overcoming the disadvantages of a steep, uneven terrain, encapsulate the continuous history of human settlement in this region over the past millennium."

2.3.1.2.6 Hortobágy National Park, Hungary (1999)

Hortobágy is the largest continuous natural grassland in Europe, which means that it was not formed as a result of deforestation or river control. The first Hungarian national park (established in 1973), it is the country's largest protected region (82 thousand hectares). A significant part of it is Biosphere Reserve and a quarter of its region enjoys international protection under the Ramsar Convention on the conservation of wetlands.

2.3.1.2.7 Dresden Elbe Valley, Germany (2004)

"The 18th- and 19th-century cultural landscape of Dresden Elbe Valley .. features low meadows, and is crowned by the Pillnitz Palace and the center of Dresden with its numerous monuments and parks from the 16th to 20th centuries. The landscape also features 19th- and 20th-century suburban villas and gardens and valuable natural features."

This landscape was struck from the World Heritage list in 2009.

2.3.1.2.8 West Lake Cultural Landscape of Hangzhou (2011)

"The West Lake Cultural Landscape of Hangzhou, comprising the West Lake and the hills surrounding its three sides, has inspired famous poets, scholars and artists since the 9th century. It comprises numerous temples, pagodas, pavilions, gardens and ornamental trees, as well as causeways and artificial islands."

2.3.2 Cultural Identity

Cultural identity or **Individuality** is the identity of a group or culture or of an individual as far as one is influenced by one's belonging to a group or culture. Cultural identity is similar to and overlaps with, *identity politics*.

2.3.2.1 Description

Various modern cultural studies and social theories have investigated cultural identity. In recent decades, a new form of identification has emerged which breaks down the understanding of the individual as a coherent whole subject into a collection of various cultural identifiers. These cultural identifiers may be the result of various circumstances including: location, gender, race, history, nationality, language, sexuality, religious beliefs, aesthetics, and even food. The divisions between cultures can be very fine in some parts of the world, especially places such as Canada or the United States, where the population is ethnically diverse and social unity is based primarily on common social values and beliefs.

As a "historical reservoir", culture is an important factor in shaping identity. Some critics of cultural identity argue that the preservation of cultural identity, being based upon difference, is a divisive force in society, and that cosmopolitanism gives individuals a greater sense of shared citizenship. When considering practical association in international society, states may share an inherent part of their 'make up' that gives common ground and an alternative means of identifying with each other. Nations provide the framework for cultural identities called external cultural reality, which influences the unique internal cultural realities of the individuals within the nation.

Also of interest is the interplay between cultural identity and new media.

Rather than necessarily representing an individual's interaction within a certain group, cultural identity may be defined by the social network of people imitating and following the social norms as presented by the media. Accordingly, instead of learning behaviors and knowledge of cultural/religious groups, individuals may be learning these social norms from the media to build on their cultural identity.

A range of cultural complexities structure the way individuals operate with the cultural realities in their lives. Nation is a large factor of the cultural complexity, as it constructs the foundation for individual's

identity but it may contrast with one cultural reality. Cultural identities are influenced by several different factors such as one's religion, ancestry, skin colour, language, class, education, profession, skill, family and political attitudes. These factors contribute to the development of one's identity.

2.3.2.2 Cultural arena

It is also noted that an individual's "cultural arena", or a place where one lives in, impacts the culture that someone wants to abide by. The surroundings, the environment, the people in these places play a factor in how one feels about the culture that they wish to adopt. Many immigrants find the need to change their culture in order to fit into the culture of most citizens in the country. This can conflict with an immigrant's current belief in their culture and might pose as a problem, as they're trying to choose between the two presenting cultures.

Some might be able to adjust to the various cultures in the world by committing to two or more cultures. It is not required to stick to one culture and thus many might be interested in socializing and interacting with people in one culture in addition to another group of people of another culture. The amazing thing about culture is that it's able to take many forms and can change depending on the cultural region.

2.3.2.3 Language

Language develops from the wants of the people who tend to disperse themselves in a common given location over a particular period of time. This tends to allow people to share a way of life that generally links individuals in a certain culture that is identified by the people of that group. The affluence of communication that comes along with sharing a language promotes connections and roots to ancestors and cultural histories.

Language also includes the way people speak with peers, family members, authority figures, and strangers.

The language learning process can also be affected by cultural identity via the understanding of specific words, and the preference for specific words when learning and using a second language.

Since many aspects of a person's cultural identity can be changed, such as citizenship or influence from outside cultures can change cultural traditions, language is a main component of cultural identity.

2.3.2.4 Education

Kevin McDonough pointed out, in his article, several factors concerning support or rejection of the government for different cultural identity education systems. Other authors have also shown concern for the state support regarding equity for children, school transitions and multicultural education. During March 1998, the two authors, Linda D. Labor and Sherry L. Field collected several useful books and resources to promote multicultural education In South Africa.

2.3.2.5 School transitions

How great is "Achievement Loss Associated with the Transition to Middle School and High School"? John W. Alspaugh's research is in the September/October 1998 Journal of Educational Research (vol. 92, no. 1), 2026. Comparing three groups of 16 school districts, the loss was greater where the transition was

from sixth grade than from a K-8 system. It was also greater when students from multiple elementary schools merged into a single middle school. Students from both K-8 and middle schools lost achievement in transition to high school, though this was greater for middle school students, and high school dropout rates were higher for districts with grades 6-8 middle schools than for those with K-8 elementary schools.

The Jean S. Phinney Three-Stage Model of Ethnic Identity Development is a widely accepted view of the formation of cultural identity. In this model cultural Identity is often developed through a three stage process: unexamined cultural identity, cultural identity search, and cultural identity achievement.

Unexamined cultural identity: "a state where one's cultural characteristics are taken for granted, and consequently there is little interest in exploring cultural issues." This for example is the stage one is in throughout their childhood when one doesn't distinguish between cultural characteristics of their household and others. Usually a person in this stage accepts the ideas they find on culture from their parents, the media, community, and others.

An example of thought in this stage: "I don't have a culture I'm just an American." "My parents tell me about where they lived, but what do I care? I've never lived there."

Cultural identity search: "is the process of exploration and questioning about one's culture in order to learn more about it and to understand the implications of membership in that culture." During this stage a person will begin to question why they hold their beliefs and compare it to the beliefs of other cultures. For some this stage arise from a turning point in their life or from a growing awareness of other cultures. This stage is characterized by growing awareness in social and political forums and a desire to learn more about the culture. This can be expressed by asking family members questions about heritage, visiting museums, reading of relevant cultural sources, enrolling in school courses, or attendance at cultural events. This stage might have an emotional component as well.

An example of thought in this stage: "I want to know what we do and how our culture is different from others." "There are a lot of non-Japanese people around me, and it gets pretty confusing to try and decide who I am."

Cultural identity achievement: "is characterized by a clear, confident acceptance of oneself and an internalization of one's cultural identity." In this stage people often allow the acceptance of their cultural identity play a role in their future choices such as how to raise children, how to deal with stereotypes and any discrimination, and approach negative perceptions. This usually leads to an increase in self-confidence and positive psychological adjustment

Review Questions

- 1. Define the culture?
- 2. Explain the Cultural Differences?
- 3. Explain the Cultural Landscapes?
- 4. Explain the Cultural Identity?

Discussion Questions

Discuss the culture and its various aspects?

Ch3- Farming and Rural Land Use

Learning Objectives

- To define the Development of Farming.
- To explain the Agricultural Production Regions.
- To explain the Rural Land Use.
- To describe the Commercial Farming.

3.1 Development and Diffusion of Farming

3.1.1 Introduction

What might head a list of the defining characteristics of the human species? While our view of ourselves could hardly avoid highlighting our accomplishments in engineering, art, medicine, space travel and the like, in a more dispassionate assessment *farming* would probably displace all other contenders for top billing. Most of the other achievements of humankind have followed from this one. Almost without exception, all people on earth today are sustained by farming. With a minute number of exceptions, no other species are a farmer. Essentially all of the arable land in the world is under cultivation. Yet farming began just a few thousand years ago, long after the appearance of anatomically modern humans.

Given the rate and the scope of this revolution in human biology, it is quite extraordinary that there is no generally accepted model accounting for the origin of farming. Indeed, an increasing array of arguments over recent years has suggested that farming, far from being a natural and upward step, in fact led commonly to a lower quality of life. Hunter-gatherers typically do less work for the same amount of food, are healthier, and are less prone to famine than primitive farmers (Lee & DeVore 1968, Cohen 1977, 1989). A biological assessment of what has been called the puzzle of farming might phrase it in simple ethological terms: why was this behavior (farming) reinforced (and hence selected for) if it was not offering adaptive rewards surpassing those accruing to hunter-gathering or foraging economies?

This paradox is responsible for a profusion of models of the origin of farming. 'Few topics in prehistory', noted Hayden (1990) 'have engendered as much discussion and resulted in so few satisfying answers as the attempt to explain why hunter/gatherers began to cultivate plants and raise animals. Climatic change, population pressure, sedentism, resource concentration from desertification, girls' hormones, land ownership, geniuses, rituals, scheduling conflicts, random genetic kicks, natural selection, broad spectrum adaptation and multicausal retreats from explanation have all been proffered to explain domestication. All have major flaws ... the data do not accord well with any one of these models.'

Recent discoveries of potentially psychoactive substances in certain agricultural products -- cereals and milk -- suggest an additional perspective on the adoption of farming and the behavioural changes ('civilisation') that followed it. In this paper we review the evidence for the drug-like properties of these foods, and then show how they can help to solve the biological puzzle just described.

3.1.2 The transition to farming

From about 10,000 years ago, groups of people in several regions around the world began to abandon the foraging lifestyle that had been successful, universal and largely unchanged for millennia (Lee & DeVore 1968). They began to gather, then cultivate and settle around, patches of cereal grasses and to domesticate animals for meat, labor, skins and other materials, and milk.

Farming, based predominantly on wheat and barley, first appeared in the Middle East, and spread quickly to western Asia, Egypt and Europe. The earliest civilizations all relied primarily on cereal farming. The cultivation of fruit trees began three thousand years later, again in the MiddleEast, and vegetables and other crops followed (Shari 1986). The cultivation of rice began in Asia about 7000 years ago (Stark 1986).

To this day, for most people, two-thirds of protein and calorie intake is a cereal-derived. (In the west, in the twentieth century, cereal consumption has decreased slightly in favor of meat, sugar, fats and so on.) The respective contributions of each cereal to current total world production are: wheat (28 per cent), corn/maize (27 per cent), rice (25 per cent), barley (10 per cent), others (10 per cent) (Pedersen et al. 1989).

The change in the diet due to farming

The modern human diet is very different from that of closely related primates and, almost certainly, early hominids (Gordon 1987). Though there is controversy over what humans ate before the development of farming, the diet certainly did not include cereals and milk in appreciable quantities. The storage pits and processing tools necessary for significant consumption of cereals did not appear until the Neolithic (Washburn & Lancaster 1968). Dairy products were not available in quantity before the domestication of animals.

The early hominid diet (from about four million years ago), evolving as it did from that of primate ancestors, consisted primarily of fruits, nuts and other vegetable matter, and some meat -- items that could be foraged for and eaten with little or no processing. Comparisons of primate and fossil-hominid anatomy, and of the types and distribution of plants eaten raw by modern chimpanzees, baboons and humans (Peters & O'Brien 1981, Kay 1985), as well as microscope scrutiny of wear patterns on fossil teeth (Walker 1981, Peuch et al. 1983) suggest that australopithecines were 'mainly frugivorous omnivores with a dietary pattern similar to that of modern chimpanzees' (Susman 1987:171).

The diet of pre-agricultural but anatomically modern humans (from 30,000 years ago) diversified somewhat, but still consisted of meat, fruits, nuts, legumes, edible roots and tubers, with consumption of cereal seeds only increasing towards the end of the Pleistocene (e.g. Constantini 1989 and subsequent chapters in Harris and Hillman 1989).

The rise of civilization

Within a few thousand years of the adoption of cereal farming, the old hunter-gatherer style of social

organization began to decline. Large, hierarchically organized societies appeared, centered around the villages and then cities. With the rise of civilization and the state came socioeconomic classes, job specialization, governments and armies.

The size of populations living as coordinated units rose dramatically above pre-agricultural norms. While hunter-gatherers lived in egalitarian, autonomous bands of about 20 closely related persons, with at most a tribal level of organization above that, early agricultural villages had 50 to 200 inhabitants, and early cities 10,000 or more. People 'had to learn to curb deep-rooted forces which worked for increasing conflict and violence in large groups' (Pfeiffer 1977:438).

Farming and civilization meant the end of foraging -- a subsistence method with short term goals and rewards -- and the beginning (for most) of regular arduous work, oriented to future payoffs and the demands of superiors. 'With the coming of large communities, families no longer cultivated the land for themselves and their immediate needs alone, but for strangers and for the future. They worked all day instead of a few hours a day, as hunter-gatherers had done. There were schedules, quotas, overseers, and punishments for slacking off' (Pfeiffer 1977:21).

The phenomena of human farming and civilization are ecologically interesting, because (1) virtually no other species live in this way, and (2) humans did not live this way until relatively recently. Why was this way of life adopted, and why has it become dominant in the human species?

Problems explaining farming

Until recent decades, the transition to farming was seen as an inherently progressive one: people learnt that planting seeds caused crops to grow, and this new improved food source led to larger populations, sedentary farm and town life, more leisure time and so to specialization, writing, technological advances and civilization. It is now clear that farming was adopted despite certain disadvantages of that lifestyle (e.g. Flannery 1973, Henry 1989). There is a substantial literature (e.g. Reed 1977), not only on how farming began, but why. Palaeopathological and comparative studies show that health deteriorated in populations that adopted cereal farming, returning to pre-agricultural levels only in modem times. This is in part attributable to the spread of infection in crowded cities, but is largely due to a decline in dietary quality that accompanied intensive cereal farming (Cohen 1989). People in many parts of the world remained hunter-gatherers until quite recently; though they were quite aware of the existence and methods of farming, they declined to undertake it (Lee & DeVore 1968, Harris 1977). Cohen (1977:141) summarized the problem by asking: 'If farming provides neither better diet, nor greater dietary reliability, nor greater ease, but conversely appears to provide a poorer diet, less reliably, with greater labor costs, why does anyone become a farmer?'

Many explanations have been offered, usually centered around a particular factor that forced the adoption of farming, such as environmental or population pressure. Each of these models has been criticized extensively, and there is at this time no generally accepted explanation of the origin of farming.

Problems explaining civilization

A similar problem is posed by the post-agricultural appearance, all over the world, of cities and states, and again there is a large literature devoted to explaining it (e.g. Claessen & Skalnik 1978). The major behavioral changes made in adopting the civilized lifestyle beg explanation. Bledsoe (1987:136) summarized the situation thus:

'There has never been and there is not now agreement on the nature and significance of the rise of civilization. The questions posed by the problem are simple, yet fundamental. How did civilization come about? What an animus impelled man to forego the independence, intimacies, and invariability of tribal existence for the much larger and more impersonal political complexity we call the state? What forces fused to initiate the mutation that slowly transformed nomadic societies into populous cities with ethnic mixtures, stratified societies, diversified economies and unique cultural forms? Was the advent of civilization the inevitable result of social evolution and natural laws of progress or was the man the designer of his own destiny? Have technological innovations been the motivating force or was it some intangible factor such as religion or intellectual advancement?'

To a very good approximation, every civilization that came into being had cereal farming as its subsistence base, and wherever cereals were cultivated, civilization appeared. Some hypotheses have linked the two. For example, Wittfogel's (1957) 'hydraulic theory' postulated that irrigation was needed for farming, and the state was in turn needed to organize irrigation. But not all civilizations used irrigation, and other possible factors (e.g. river valley placement, warfare, trade, technology, religion, and ecological and population pressure) have not led to a universally accepted model.

3.1.3 Exorphins: opioid substances in food

Prompted by a possible link between diet and mental illness, several researchers in the late 1970s began investigating the occurrence of drug-like substances in some common foodstuffs.

Dohan (1966, 1984) and Dohan et al. (1973, 1983) found that symptoms of schizophrenia were relieved somewhat when patients were fed a diet free of cereals and milk. He also found that people with coeliac disease -- those who are unable to eat wheat gluten because of higher than normal permeability of the gut -- were statistically likely to suffer also from schizophrenia. Research in some Pacific communities showed that schizophrenia became prevalent in these populations only after they became 'partially westernized and consumed wheat, barley beer, and rice' (Dohan 1984).

Groups led by Zioudrou (1979) and Brantl (1979) found opioid activity in wheat, maize and barley (exorphins), and bovine and human milk (casomorphin), as well as stimulatory activity in these proteins, and in oats, rye and soy. Cereal exorphin is much stronger than bovine casomorphin, which in turn is stronger than human casomorphin. Mycroft et al. (1982, 1987) found an analogue of MIF-1, a naturally occurring dopaminergic peptide, in wheat and milk. It occurs in no other exogenous protein. (In subsequent sections we use the term exorphin to cover exorphins, casomorphin, and the MIF-1 analogue. Though opioid and dopaminergic substances work in different ways, they are both 'rewarding', and thus more or less equivalent for our purposes.)

Since then, researchers have measured the potency of exorphins, showing them to be comparable to

morphine and enkephalin (Heubner et al. 1984), determined their amino acid sequences (Fukudome &Yoshikawa 1992), and shown that they are absorbed from the intestine (Svedburg et al.1985) and can produce effects such as analgesia and reduction of anxiety which are usually associated with poppy-derived opioids (Greksch et al.1981, Panksepp et al.1984). Mycroft et al. Estimated that 150 mg of the MIF-1 analogue could be produced by the normal daily intake of cereals and milk, noting that such quantities are orally active, and half this amount 'has induced mood alterations in clinically depressed subjects'.

Most common drugs of addiction are either opioid (e.g heroin and morphine) or dopaminergic (e.g. Cocaine and amphetamine), and work by activating reward centers in the brain. Hence we may ask, do these findings mean that cereals and milk are chemically rewarding? Are humans somehow 'addicted' to these foods?

3.1.4 Problems in interpreting these findings

Discussion of the possible behavioral effects of exorphins, in normal dietary amounts, has been cautious. Interpretations of their significance have been of two types:

where a *pathological* effect is proposed (usually by cereal researchers, and related to Dohan's findings, and

where a *natural* function is proposed (by milk researchers, who suggest that casomorphin may help in mother-infant bonding or otherwise regulate infant development).

We believe that there can be no natural function for ingestion of exorphins by adult humans. It may be that a desire to find a natural function has impeded interpretation (as well as causing attention to focus on milk, where a natural function is more plausible). It is unlikely that humans are adapted to a large intake of cereal exorphin, because the modern dominance of cereals in the diet is simply too new. If exorphin is found in cow's milk, then it may have a natural function for cows; similarly, exorphins in human milk may have a function for infants. But whether this is so or not, adult humans do not naturally drink milk of any kind, so any natural function could not apply to them.

Our sympathies therefore lie with the pathological interpretation of exorphins, whereby substances found in cereals and milk are seen as modern dietary abnormalities which may cause schizophrenia, coeliac disease or whatever. But these are serious diseases found in a minority. Can exorphins be having an effect on humankind at large?

3.1.5 Other evidence for 'drug-like' effects of these foods

Research into food *allergy* has shown that normal quantities of some foods can have pharmacological, including behavioral, effects. Many people develop intolerances to particular foods. Various foods are implicated, and a variety of symptoms is produced. (The term 'intolerance' rather than allergy is often used, as in many cases the immune system may not be involved (Egger 1988:159). Some intolerance symptoms, such as anxiety, depression, epilepsy, hyperactivity, and schizophrenic episodes involve brain

function (Egger 1988, Scadding & Brostoff 1988).

Radcliffe (1982, quoted in 1987:808) listed the foods at fault, in descending order of frequency, in a trial involving 50 people: wheat (more than 70 per cent of the subjects reacted in some way to it), milk (60 per cent), egg (35 percent), corn, cheese, potato, coffee, rice, yeast, chocolate, tea, citrus, oats, pork, plaice, cane, and beef (10 percent). This is virtually a list of foods that have become common in the diet following the adoption of farming, in order of prevalence. The symptoms most commonly alleviated by treatment were mood change (>50 per cent) followed by headache, musculoskeletal and respiratory ailments.

One of the most striking phenomena in these studies is that patients often exhibit cravings, addiction and withdrawal symptoms with regard to these foods. Brostoff and Gamlin estimated that 50 per cent of intolerance patients crave the foods that cause them problems, and experience withdrawal symptoms when excluding those foods from their diet. Withdrawal symptoms are similar to those associated with drug addictions (Radcliffe 1987:808). The possibility that exorphins are involved has been noted (Bell 1987:715), and Brostoff and Gamlin conclude (1989:230):

'... the results so far suggest that they might influence our mood. There is certainly no question of anyone getting 'high' on a glass of milk or a slice of bread - the amounts involved are too small for that - but these foods might induce a sense of comfort and wellbeing, as food-intolerant patients often say they do. There are also other hormone-like peptides in partial digests of food, which might have other effects on the body.'

There is no possibility that craving these foods has anything to do with the popular notion of the body telling the brain what it needs for nourishmental purposes. These foods were not significant in the human diet before farming, and large quantities of them cannot be necessary for nourishment. In fact, the standard way to treat food intolerance is to remove the offending items from the patient's diet.

3.1.6 A suggested interpretation of exorphin research

But what are the effects of these foods on normal people? Though exorphins cannot have a naturally selected physiological function in humans, this does not mean that they have *no* effect. Food intolerance research suggests that cereals and milk, in normal dietary quantities, are capable of affecting behavior in many people. And if severe behavioral effects in schizophrenics and coeliacs can be caused by higher than normal absorption of peptides, then more subtle effects, which may not even be regarded as abnormal, could be produced in people generally.

The evidence presented so far suggests the following interpretation.

The ingestion of cereals and milk, in normal modern dietary amounts by normal humans, activates reward centers in the brain. Foods that were common in the diet before farming (fruits and so on) do not have this pharmacological property. The effects of exorphins are qualitatively the same as those produced by other opioid and / or dopaminergic drugs, that is, reward, motivation, reduction of anxiety, a sense of well being, and perhaps even addiction. Though the effects of a typical meal are quantitatively less than those

of doses of those drugs, most modern humans experience them several times a day, every day of their adult lives.

When this scenario of human dietary practices is viewed in the light of the problem of the origin of farming described earlier, it suggests an hypothesis that combine the results of these lines of inquiry.

Exorphin researchers, perhaps lacking a long-term historical perspective, have generally not investigated the possibility that these foods really are drug-like, and have instead searched without success for exorphin's natural function. The adoption of cereal farming and the subsequent rise of civilization have not been satisfactorily explained, because the behavioral changes underlying them have no obvious adaptive basis.

These unsolved and until-now unrelated problems may in fact solve each other. The answer, we suggest, is this: cereals and dairy foods are not natural human foods, but rather are preferred because they contain exorphins. This chemical reward was the incentive for the adoption of cereal farming in the Neolithic. Regular self-administration of these substances facilitated the behavioral changes that led to the subsequent appearance of civilization.

Climatic change at the end of the last glacial period led to an increase in the size and concentration of patches of wild cereals in certain regions (Wright 1977). The large quantities of cereals newly available provided an incentive to try to make a meal of them. People who succeeded in eating sizeable amounts of cereal seeds discovered the rewarding properties of the exorphins contained in them. Processing methods such as grinding and cooking were developed to make cereals more edible. The more palatable they could be made, the more they were consumed, and the more important the exorphin reward became for more people.

At first, patches of wild cereals were protected and harvested. Later, land was cleared and seeds were planted and tended, to increase quantity and reliability of supply. Exorphins attracted people to settle around cereal patches, abandoning their nomadic lifestyle, and allowed them to display tolerance instead of aggression as population densities rose in these new circumstances.

Though it was, we suggest, the presence of exorphins that caused cereals (and not an alternative already prevalent in the diet) to be the major early cultigens, this does not mean that cereals are 'just drugs'. They have been staples for thousands of years, and clearly have nourishment value. However, treating cereals as 'just food' leads to difficulties in explaining why anyone bothered to cultivate them. The fact that overall health declined when they were incorporated into the diet suggests that their rapid, almost total replacement of other foods was due more to chemical reward than to nourishmental reasons.

It is noteworthy that the extent to which early groups became civilized correlates with the type of farming they practiced. That is, major civilizations (in south-west Asia, Europe, India, and east and parts of South-East Asia; central and parts of north and south America; Egypt, Ethiopia and parts of tropical and west Africa) stemmed from groups which practice cereal, particularly wheat, farming (Bender 1975:12, Adams 1987:201, Thatcher 1987:212). (The rarer nomadic civilizations were based on dairy farming.)

Groups which practiced vegeculture (of fruits, tubers etc.), or no farming (in tropical and south Africa, north and central Asia, Australia, New Guinea and the Pacific, and much of north and south America) did not become civilized to the same extent.

Thus major civilizations have in common that their populations were frequent ingesters of exorphins. We propose that large, hierarchical states were a natural consequence among such populations. Civilization

arose because reliable, on-demand availability of dietary opioids to individuals changed their behavior, reducing aggression, and allowed them to become tolerant of sedentary life in crowded groups, to perform regular work, and to be more easily subjugated by rulers. Two socioeconomic classes emerged where before there had been only one (Johnson & Earle 1987:270), thus establishing a pattern which has been prevalent since that time.

3.2 Major Agricultural Production Regions

In 1961 the world was feeding 3.5 billion people by cultivating 1.37 billion hectares of land. A half century later, the world population had doubled to 7 billion while land under cultivation increased by only 12 percent to 1.53 billion hectares. How, then, did agricultural production triple? By increasing productivity. By getting more output from existing resources, global farming has grown, proving wrong past concerns that the world's population would exceed its food supply. In fact, at the global level, the long-run trend since at least 1900 has been one of increasing food abundance: in inflation-adjusted dollars, food prices fell by an average of 1 percent per year over the course of the 20th century. But then, over the past decade, something changed.

Figure 1 - Agricultural price index and population trend, 1900-2010



FIGURE 1 Agricultural price index and population trend, 1900–2010

Source: K. O. Fuglie and S. L. Wang, "New Evidence Points to Robust but Uneven Productivity Growth in Global Agriculture," *Amber Waves* 10 (September 2012).

Sources: Source: K. O. Fuglie and S. L. Wang, "New Evidence Points to Robust but Uneven Productivity Growth in Global Farming," Amber Waves 10 (September 2012).

Around 2002, real food prices began to rise, and the shock was not merely a temporary one. Agricultural commodity prices spiked sharply in 2008, 2010, and again in 2012. Demand-side factors (including continued population growth, greater per capita consumption of meat, and diversion of crop commodities for biofuel) and weather-induced production shocks (like the 2012 drought in North America) are certainly major forces behind the high and volatile prices of recent years. But the persistence of rising commodity prices has renewed concerns about whether farming is facing new constraints on growth. In fact, for major cereal grains like wheat and rice, average rates of yield growth have slowed from about 2 percent per year in the 1970s and 1980s to about 1 percent per year since 1990. Additionally, there is evidence that some developed countries have recently seen a slowing down of growth in agricultural total factor productivity (a broad measure of sector wise productivity), which has an effect on developing and developed countries alike. A slowdown in agricultural productivity growth could signal rising food scartown , higher commodity prices, and increased competition for the world's land, water, and energy resources. With such grave consequences, it is more urgent than ever to ensure agricultural productivity growth. This chapter offers a reassessment of that growth at the global level and identifies ways to keep it on the upswing.

3.2.1 What Changed?

World farming has undergone some fundamental changes in the past few decades. One has been that many developing countries have greatly expanded their capacities in agricultural research and innovation. Combined with support from international agricultural research centers, this has led to the availability of improved technologies and practices for local farmers. Complementing this has been institutionalized and policy reforms, improvements in farmer education and health, and investments in rural infrastructure, all of which help create an environment where new farm technologies and practices are adopted more rapidly. Greater productivity growth in developing-country farming can certainly pull up the average for global productivity.

A second major development has been the changing location and composition of global agricultural production. With the slower agricultural growth in developed countries and a significant reduction in agricultural output from post-Soviet states, developing countries now account for a large and growing share of global agricultural production. And, as rising incomes cause changes in the types of food consumers demand, the share of staple food commodities in world agricultural production has declined. Two new studies—one published in 2012 and one that is forthcoming—used different methods to estimate trends in agricultural productivity at the global level. Both found that the productivity growth rate has actually accelerated in recent decades, led by improving performance in developing countries. It follows, therefore, that future challenges to global food security, apart from long-term risks related to climate change, are more likely to be the result of uneven access to resources, technologies, and food than the world's ability to increase global agricultural production and food availability in the aggregate.

3.2.2 Cutting Consumer Food Waste

Industrialized countries waste more food per capita than developing countries. For example, in 2007 North America and Europe wasted 95–115 kilograms of food per capita, compared with 6–11 kilograms per capita in Africa south of the Sahara and South and Southeast Asia. Few peer-reviewed, published studies provide national food waste estimates, particularly for farm-level losses. Nevertheless, the food waste literature suggests that most of the food waste in industrialized countries occurs at the consumer level (not at the farm level, as in developing countries). Waste also represents lost resources used to

produce that food. This means that soil is eroded, water sources depleted, and air possibly polluted for food that never even gets consumed.

It would, of course, be ideal to just generate less waste overall. As a supplemental strategy, the US Environmental Protection Agency's "food recovery hierarchy" suggests that the top priority is to recover or claim wholesome food before it is wasted to feed hungry people by, for example, donating it to local food banks. Using food waste that meets safety standards for livestock, zoo animals, and pets are next in the hierarchy, followed by recycling food and food waste for industrial purposes. Composting food to improve soil fertility is a relatively low priority because the focus is to first make the most of the resource material before returning it to the soil. The last resort should be disposal through landfilling or incineration because of the negative impacts on the environment.

Food waste occurs for many reasons. Many of these causes are similar across industrialized countries (for example, food often spoils when consumers buy more than they need with family-sized packaging or "buy 1, get 1 free" offers), but some factors have greater variation and are less understood (such as food used in cultural traditions). Regardless, food waste at the consumer level is so widespread—occurring every day in millions of households, food-service venues, schools, hospitals, and other institutions worldwide—that interventions will be challenging. Diverting uneaten food to the next best use involves resource and logistical challenges, but perhaps the success story of recycling can provide helpful information.

Understanding where and how much food is wasted and the value of this waste is important information that industries and policymakers can use to raise awareness, reduce food waste, and increase the efficiency of both the farm-to-fork system and food recovery efforts to feed the growing population. Governments may be able to work with the food industry and consumer groups to motivate reductions in food waste at every stage of the food chain.

3.3 Rural Land Use and Settlement Patterns

3.3.1 Rural regions

Rural regions are also known as 'countryside' or a 'village' in India. It has a very low density of population. In rural regions, farming is the chief source of livelihood along with fishing, cottage industries, pottery etc. The quest to discover the real rural India still continues in great earnest. Almost every economic agency today has a definition of rural India. Here are a few definitions: According to the Planning Commission, a town with a maximum population of 15,000 is considered rural in nature. In these regions the Panchayat takes all the decisions. There are five people in the Panchayat. The National Sample Survey Organization (NSSO) defines 'rural' as follows:

- A region with a population density of up to 400 per square kilometer,
- Villages with clear surveyed boundaries but no municipal board,
- A minimum of 75% of the male working population involved in farming and allied activities.

RBI defines rural regions as those regions with a population of less than 49,000 (tier -3 to tier-6 cities). It is generally said that the rural regions house up to 70% of India's population. Rural India contributes a big chunk to India's GDP by way of farming, self-employment, services, construction etc. As per a strict measure used by the National Sample Survey in its 63rd round, called monthly per capita expenditure, rural expenditure accounts for 55% of total national monthly expenditure. The rural population presently accounts for one -third of the total Indian FMCG sales.

Land use pattern in India relates to the physical characteristics of land, the institutional and other resources framework like labor, capital available. All these aspects are associated with the economic development. India has a total land region of approximately 328 million hectares. Mostly, land utilization statistics are obtainable for almost 93 % of the entire region that is around 306 million hectares. It is considerable to note that every forefather over the past 8,000 years or so have been successful in harboring nearly 140 million hectares of land from the natural ecosystem to farming. From the time of independence, people have been successful to add another 22 million hectares. As a result, 162 million hectares of land excel as the net sown region at present. It forms a stupendous percentage of as high as 51%. No other large country is as fortunate as India in this regard.

3.3.1.1 Reporting and Non-Reporting Land

The land for which the data on classification of land-use is available is known as Reporting Land. In some cases the reporting land is that land, where the land use pattern figures are supported on land records and are based on village records or papers. These records are preserved by the village revenue agency and here the data are completely based on details of entire regions. In cases, where the records are not preserved, the estimates are mostly based on a sample survey. Thus, the statistics of land use pattern are based on these two methods. On the other hand, the lands where no data are available are known as Non-Reporting Lands.

3.3.1.2 Uncultivated Land

According to the available land use statistics, there has been a slight increase in the net sown region. Almost 28 million hectares have been added over the passing few decades. Around 1.3 % of the land is under fruit trees. Nearly 5 % of the land fall in the category of uncultivated land which is cultivated once every 2 to 3 years. Thus, near about 51% of the whole region, on an average, is cultivated once a year. The uncultivated lands are subsidiary lands and are kept so to re-establish their richness. Its use depends upon high-quality and timely rains also.

3.3.1.3 Pastures and other Grazing Lands

The region separated as cultivable waste, has remained stationary at around 6.4 % for several decades. The land under permanent pastures is despondently low and suggests a remarkable population pressure on the land. Also, credit must be confirmed on the farmers that with so modest land under pastures, they have the biggest number of cattle. They are nurtured mainly on the husk, grain chaff, farm waste and few fodder crops. This is definitely the most economical way to have a larger number of drought animals and bovine cattle. Regions that have been classed under forests are also used for cattle grazing.

Forested land in India is far less in scientific norm. For a self-sufficient economy and accurate ecological steadiness, at least one third of the total land region must be kept under forests and natural vegetation. In India, it is as low as 19.27%. Photographic proof, gained from satellites has confirmed that only about 46 million hectares come under real forests, as opposed to the estimated 63 million hectares, according to the figures of land use pattern. However, this outline establishes a tiny rise from 40 million hectares.

3.3.1.4 Forest Lands

It is important for the populace to ensure that they increase the region under forests for reasons more than one. A bigger region under forests is an obligation, to maintain the ecological balance and for absorption of carbon dioxide, the assemblage of which is likely to heighten the greenhouse effect. This in turn would raise atmospheric temperature at the global stage. It may lead to thawing of ice caps and equivalent rise in sea level, jeopardizing low-lying densely populated parts of the world. Forests supply home to wildlife and help their continuation. They help in enhancing the level of rainfall, minimizing cases of famine. Forested lands also help in permeation of rainwater in the subsoil and modulating the flow of river waters in both rainy and dry seasons. Forests safeguard not only water but soil as well. They, thus, help in plunging the volume of floodwaters and their ferotown.

3.3.1.5 Wasteland

A part of the land that is not utilized for the moment is classified as wasteland. This embraces the baked and rocky deserts. High mountainous and uneven lands also fall into this category. At times humankind has also been responsible to add to such regions by deforestation and overgrazing.

3.3.1.6 Measures for proper Land Use

The mounting population and advanced standards of living have resulted in an ever increasing demand for residential land, both in villages and towns. Cities and towns are obligated to grow vertically rather than horizontally. Land is needed to develop industry, commerce, transport and recreational facilities. In view of mounting pressure on land for numerous purposes, it is customary to plan appropriate use of all the obtainable land. This may be done by following fitting measures to control soil erosion, desertification etc. which turns cultivatable land into wildernesses. In addition, some of the barrens may be brought around for different uses. Likewise, with the help of up-to-date and scientific methods of farming, productivity of land can also be amplified. All endeavors should be made to strike a balance amongst diverse use of land.

In India the capacity for expansion of cultivation to further new regions is very restricted. As of now, 49% of the entire reporting land are cultured. Fallow and other wastelands, including grazing pastures, which are not presently cultivated, is presumed around 42 million hectares, and further expansion of cultivation of such lands would be expensive as improvements should be made on irrigation and water and soil conservation.

In the dynamic context, keeping in view the natural endowments and the recent advances in technology, the overall interests of a country may dictate a certain modification of or a change in the existing land-use pattern of a region. A proper study of the present land-use patterns and the developing trends will help to suggest the scope for planned shift in the patterns in India.

3.3.2 Settlement Patterns

3.3.2.1 Settlement Patterns in Ancient India

Some of the plans of rural settlements in Ancient India have been discussed elaborately in the ancient texts like Manasara Shilpashastra. Shilpashastras are old Sanskrit texts which were possibly compiled about the fifth or sixth century B.C. but the tradition which they indicate are of greater antiquity. VideHavels wrote about them in Ancient and medieval Architecture of India, 1915. P.K. Acharya translated them into English with his own comments entitled as Indian Architecture in five volumes in 1927.

Most of the plans are rectangular or square and do not appear to differ in essentials. Each village was surrounded by a wall and ditch for defense purposes. There were generally four gates in the middle of the four quarters. The center of the village was generally occupied by a temple, tank or public hall. The four quarters were further sub-divided by straight streets. Each block was inhabited on the basis of caste or profession, the best quarters being generally given to Brahmins and the high caste. The easterly axis of the general plan and the intersection of the urban street by north south running shorter streets bean relationship with climatic circumstances. Such an arrangement ensured the advantage of sunlight and the proper circulation of fresh air.

The plans of rural settlements do not seem to have survived in the truest form. When one speaks of the village plan, one refers to the layout of the Basti (inhibited site) resulting from the arrangement of houses and village streets of panes. In this sense a definite pattern has emerged only in the case of compact or linear settlements which are very limited in number. At times the settlements are so irregularly huddled together that it becomes very difficult to recognize the definite pattern.

3.3.2.2 Settlement Patterns in modern India

3.3.2.2.1 Urban settlement

Although only about one-fourth of India's people live in towns and cities, more than 4,500 places are classified as urban. In general, the proportion is higher in the agriculturally prosperous regions of the northwest, west, and south than in the northeastern rice-growing parts of the country, where the population capacity is limited by generally meager crop surpluses.

In India large cities long have been growing at faster rates than small cities and towns. The major metropolitan agglomerations have the fastest rates of all, even where, as in Kolkata, there is a high degree of congestion within the central town. Major contributors to urban growth are the burgeoning of the bureaucracy, the increasing commercialization of the agricultural economy, and the spread of factory industry and services.

In many cities dating from the precolonial period, such as Delhi and Agra, the urban core is an exceedingly congested region within an old town wall, portions of which may still stand. In these "old cities" residential segregation by religion and caste and the layout of streets and open places are, except for scale, not greatly dissimilar from what was described above for shapeless agglomerated villages. In contrast to many Western cities, affluent families commonly occupy houses in the heart of the most congested urban wards. Specialized bazaar streets selling sweets, grain, cloth, Metalware, jewelry, books and stationery, and other commodities are characteristic of the old town . In such streets it is common for a single building to be at once a workshop, a retail outlet for what the workshop produces, and the residence for the artisan's family and employees.

Moderately old, highly congested urban cores also characterize many cities that grew up in the wake of British occupation. Of these, Kolkata, Mumbai, and Chennai are the most notable examples. In such cases, however, there are usually a few broad major thoroughfares, some degree of regularity to the street pattern, space reserved for parks, and a central business district, including old government offices, highrise commercial office buildings, banks, elite shopping establishments, restaurants, hotels, museums, a few churches, and other reminders of the former colonial presence.

Associated with a great many cities are special sections created originally for the needs of the British: largely residential regions known as civil lines, where the families of resident European administrators occupied spacious bungalows, with adjoining outbuildings for their servants, nearby shopping facilities, and a gymkhana (a combined sports and social club); cantonments, where military personnel of all ranks were quartered, together with adjacent parade grounds, polo fields, and firing ranges; and industrial zones, including not only the modern mills but also the adjacent "factory lines," reminiscent of 19th-century company housing in Britain but even more squalid.

In the postindependence period, with the acceleration of urban growth and the consequent need for urban planning, new forms arose. The millions of refugees from Pakistan, for example, led to the establishment of many "model" (i.e., planned) towns on the edges of the existing cities. The subsequent steady influx of

job seekers, together with the natural growth of the already settled population, gave rise to many planned residential regions, typically called "colonies," usually consisting of four- or five-story apartment blocks, a small shopping center, schools, and playgrounds and other recreational spaces. In general, commuting from colonies to jobs in the inner town is by either bus or bicycle.

For poorer immigrants, residence in these urban colonies was not an option. Some could afford to move into slum flats, often sharing space with earlier immigrants from their native villages. Others, however, had no recourse but to find shelter in *bastis* (shanty towns), clusters of anywhere from a few to many hundreds of makeshift dwellings, which are commonly found along the edges of railroad yards and parks, outside the walls of factories, along the banks of rivers, and wherever else the urban authorities might tolerate their presence. Finally, there are the street dwellers, mainly single men in search of temporary employment, who lack even the meager shelter that the *bastis* afford.

A special type of urban place to which British rule gave rise were the hill stations, such as Shimla (Simla) and Darjiling (Darjeeling). These were erected at elevations high enough to provide cool retreats for the dependents of Europeans stationed in India and, in the summer months, to serve as seasonal capitals of the central or provincial governments. Hotels, guest houses, boarding schools, clubs, and other recreational facilities characterize these settlements. Since independence, affluent Indians have come to depend on the hill stations no less than did the British.

3.3.2.2.2 Rural Settlement Patterns in India

The spatial organization of houses in a village defines its pattern. Here site attributes along with the layout of the land, configuration of roads and streets play a decisive role. Rectangular or square pattern is very popular in the regions of level topography. It confirms well with the systems of house design, plugging pattern, field sizes and land measurement (bigha system).

Circular or semi-circular patterns develop around a fort, temple, pond, lake, meander bank and bend of a stream. Linear pattern grows along the roadside or a water front dry point due to the effects of linio-fugal or linio-petal forces. Settlements along the river levees, roads and along the coasts sometimes assume such forms. Triangular pattern is developed under special circumstances of topographical barriers characterized by negative land features on three sides. 'L' and 'T' patterns emerge when roads intersect at right angles. While the chessboard pattern is formed by the convergence of many transport routes at a focal point. Similarly a village acquires a radial-star pattern when streets radiate from a common center.

3.3.2.2.2.1 Rural Settlements in the Himalayas

Three types of settlements are found in the Himalayan region: (i) helmeted or semi-sprinkled, (ii) dispersed or sprinkled, and (iii) isolated homesteads. The first type mainly occupies low lying valleys with a regular stretch of fairly level land. Similarly the second type is found in patches while the last type occurs at high elevations. Such settlements are generally found in Himachal Pradesh and Jammu and Kashmir.

In Jammu and Kashmir the smaller villages are generally nucleated, while the larger ones are dispersed. A special feature of Kashmir valley is the spring settlements. In the Coming Himalayas of Uttaranchal undulating relief and cold climate of agricultural land, subsistence farming, horticulture and cattle grazing have favored the growth of small dispersed settlements. These are divided into permanent, seasonal and mobile settlements. With terraced fields above and below spurs provide the most common sites for village settlements. Others are located in valley bottoms near the perennial springs and water bodies. Some localities like the valleys of Mana, Niti and Janhavi rivers have developed twin village settlements: (i)

summer settlements (Malla gram) at a height of 2700-5000 meters, and (ii) winter settlements (Talla gram) at low altitudes (below 1800 meters).

In the eastern Himalayas the settlements are small and widely dispersed due to the steep slope, undulating topography, heavy rainfall, dense forest cover and multiplicity of tribes with different dialects and rituals. Here compact and well organized villages are found in the northern zone of Indo-Tibetan culture; the lower stone exhibiting Assamese impact; and the middle zone characterized by dispersed settlements.

In Meghalaya, Khasi villages are located along the hill slopes near the water bodies which range from isolated homestead to dispersed and composite settlements. In Nagaland villages generally occupy flat tops of the hills, spurs and gentle hill slopes between 1200-2100 m of height and consist of 20-100 houses. In Manipur Kukis practicing shifting farming build their temporary houses on flat topped ridges. Lushai tribes of Mizoram build their linear settlements in valleys and on the flat-topped hills.

3.3.2.2.2.2 Rural Settlements in the Northern Great Plains

Northern Great Plains of India presents a mixture of settlement types and pattern. Rural settlements in the Rajasthan plain are small, compact and sparsely distributed owing to the limited water supply and cultivable land and the problem of security. In excessive arid regions of Barmer, Jaisalmer and Bikaner, where there is a predominance of sand dunes, helmeted settlements are noticed near the water-points. But in the eastern and northwestern parts of Rajasthan large compact villages are a common sight.

Indira canal is encouraging compact and permanent villages similar to the Punjab plains. In the canal irrigated regions of Punjab plains the villages are uniformly spaced, compact and generally circular in form. But in the regions of choosing and the flood prone regions of the Ravi River we find widely space small sized rural settlements.

Over the Upper Ganga Plain almost 55 per cent of the population lives in medium-sized villages. In the Rohilkhand Tarai regions settlements are unevenly distributed due to the high percentage of forests, marshy lands and seasonal floods. Here villages are mostly helmeted located on river bluffs and river embankments. In the 'Ghar' region settlement sites follow the drainage lines and the nature of the slope. In the regions of older alluvium (Bhangar) the settlements are compact and closely packed.

On the Middle Ganga Plain the distribution and pattern of rural settlements are largely influenced by alluvial morphology. Regions of eastern Uttar Pradesh and west Bihar are marked by small sized but closely spaced villages. Hamleted settlements are typical of the Ganga-Ghaghara doab. The Mithila plain exhibits wide variation in settlement pattern and types: linear in the lower Gandak valley, dispersed in the sub-monstrance tract of Champaran, relatively dispersed in the Ganga-Burhi Gandak doab, and irregularly scattered or linearly oriented along the levees of dead channels or oxbow lakes in Purnea. The south Bihar plain has more compact settlements than its northern counterpart.

In the Lower Ganga plains hydrological characteristics have a dominant role in determining their types and patterns. Here scattered villages are very common in the Rahr plain, Duars and Sundarbans; compact settlements abound in the Ajay-Damodar- Brahmani interfluves and helmeted ones dominate in the Bhagirathi-Dwarka interfluves. Linear pattern is apparent along the coast.

In the Brahmaputra valley villages are generally agglomerated, aligned along the river levees and transport arteries. Here villages are smaller in size in which houses are separated by bamboo fences. Machan types of houses on wooden pillars are constructed in low-lying and flood-prone regions where the boat is the only means of transport during rainy season.

3.3.2.2.2.3 Rural Settlements in the Peninsular India

Rural settlements in the Peninsular part of the country exhibit mixed types depending upon the nature of relief, soil fertility, water-supply and socioeconomic development. Throughout the hilly tract of the Aravalli region huts are widely dispersed within the revenue village lands. In the dissected hills of Mewar, Marwar and Alwar isolated farmsteads are dotted in the long narrow valleys. Tonk, Sawai Madhopur, Bundi, Jaipur districts and the Banas valley region are characterized by compact to semi-compact settlements. Sirohi district and plateau region around Udaipur are abound with isolated, dispersed and widely apart settlements.

In the highly dissected and ravine tracts of Bundelkhand large compact villages occupy the favorable and protected sites, while badlands are marked with semi-compact and dispersed settlements. Malwa region, owing to its fertile soils, has helped in the growth of large clustered settlements. But rough terrain around Sagar has favored the growth of semi-dispersed and dispersed settlements.

The Chotanagpur plateau region shows great variation in the types and patterns of rural settlements. Here Rajmahal highland, Panch Pargana and Dal Bhumi are characterized with clustered type; Ranchi plateau, Hazaribagh plateau, southeastern Damodar basin and Panch Pargana with semi-clustered type; the Kolhan highland, outer eastern part of the Ranchi plateau, Pat region, northern coal basin, southern part of Hazaribagh plateau and southeastern part of Rajmahal highlands with hamleted type; the Porhat-Dalma highland and Sigdega with semi- dispersed; and the Kolhan highland region by dispersed type of settlements.

Compact and clustered settlements have been developed in the fertile and level regions of the Baghelkhand plateau and Chhattisgarh plain which have yielded place to semi-compact type in the undulating plateau regions. The Lava plateau region of Maharashtra owing to its rich soils, good water supply and developed farming has favored the growth of clustered settlements. But semi-dispersed and dispersed settlements are also seen in the plateau region southwest of Solapur and near Pune because of its rough and undulating terrain.

In south India, large compact and widely spaced villages are the characteristic feature of the northern Maidan of Karnataka and Rayalaseema region of Andhra Pradesh. The tract between the Kaveri and the Tungabhadra, studded with numerous tanks, exhibits a close relationship with compact settlements. In Malnad region semi-dispersed to scattered hamlets are common features. The same features are replicated in the Tamil Nadu Uplands also. The forested regions along the Sahyadris have the predominance of isolated dwellings.

3.3.2.2.2.4 Rural Settlements in the Coastal Plains

The eastern and western coasts are dotted with several fishing villages of different shape and size. In the Mahanadi delta region high escarpments provide an ideal location for settlement to safeguard against floods. In the Godavari, Krishna and Kaveri deltas organized farming activity has promoted the tendency of nucleation among settlements which are generally located along the canals and on high ground or levees.

The Malabar Coast is dominated by large compact villages but coconut and cashew plantations have encouraged the growth of isolated dwellings. Coastal plains of Gujarat are marked by nucleated settlements of medium to large size. Saurashtra is a region of small villages with long inter-village spacing. The isolated farm steads in the plantation gardens of coconut and banana along the coast from
Dwarka to Bhavnagar add to the scenic beauty of the land. The semi-arid lands of the Kachchh and the Ranns have a few hamlets at long intervals hardly containing a room or two.

3.3.2.3 Main Types or Pattern of Urban and Rural Settlement in India

The form of settlement in any particular region reflects a man's relationship with his environment. The various types of settlements have evolved over a long period of time. The development and growth of settlement also depend upon the religious and social customs of the society. The buildings used for various religious and social purposes, give the settlements their distinctiveness.

The settlements are generally divided into two types-urban and rural or towns and villages. The urban settlements are differentiated from the rural settlements on the basis of certain characteristics, such as the size and density of population, economic basis, administrative basis, and the number and quality of public utility services.

Every urban or rural Centre has its own form and it is the product of its site and surroundings. The haphazard growth gives the settlement an irregular shape. The urban settlements are mostly classified on the basis of their functions. Some of them are:

The village, as a form of settlement, is closely related to the agricultural activities. The rural settlements are of two types compact and scattered. In the compact settlement, the houses are closely spaced and the streets are narrow. Such settlements develop mostly in the river valleys and fertile plains.

The scattered settlements are formed by one or two dwelling units. These are spread over great distances and are knitted by a common bond. Such settlements are found in the hills, plateau and highlands.

The settlement can also be classified according to the shapes or patterns. There are five broad types or patterns of settlements.

3.3.2.3.1 The Compactor Nucleated Settlements:

In such settlements, houses are built close to each other. They generally develop close to a railway station, a well, a quarry or an industrial site.

3.3.2.3.2 The Scattered or Dispersed Settlements:

In such settlements, houses or the individual farmhouses are isolated or scattered and are located away from each other. They develop mostly in the plateau, forested or hilly regions.

3.3.2.3.3 The Linear or Ribboned Settlements:

Such settlements generally develop along either sides of roads, railways, rivers or canals. The flood plains in hilly regions mostly have linear settlements.

3.3.2.3.4 The Rectangular Settlements:

The patterns of such settlements are determined by the nature of the junction of two or more routes. When they cross each other at right angles, the dwellings are built along the routes in all directions, thus forming rectangular settlements.

3.3.2.3.5 The Radial or Star-shaped Settlements:

Such settlements are common in towns and villages, where the dwellings spread out in several directions from a central point, which is either around a big water body or where many routes join together.

3.4 Modern Commercial Farming

Modern Commercial farming is large-scale production of crops for sale, intended for widespread distribution to wholesalers or retail outlets. In commercial farming crops such as wheat, maize, tea, coffee, sugarcane, cashew, rubber, banana, cotton is harvested and sold in world markets. Commercial farming includes livestock production and livestock grazing. Due to the expensive nature of capital formation and implementation of technological processes, the landowners of such farms are often large agricultural corporations (especially in developing countries). Commercial farming is most commonly found in advanced industrialized nations. The harvested crop may be processed on-site (or shipped to a processing facility belonging to the farm owners) and then sold to a wholesaler as a complete product, or it may be sold as-is for further processing elsewhere. Commercial farming differs significantly from subsistence farming, as the main objective of commercial farming is achieving higher profits through economies of scale, specialization, the introduction of capital-intensive farming techniques, labour-saving technologies, and maximization of crop yields per hectare through synthetic and natural resources (fertilizers, hybrid seeds, irrigation, etc.). Whereas subsistence farming is an economic model in which most members of a population work in farming to feed themselves, with limited need for trade, commercial farming is a type of farming suited to industrial or postindustrial economic models, in which most members of a population do not work in farming, are fed by others (the few who do work in farming), and purchase their food and fiber as consumers, with currency.

3.4.1 Development

Commercial farming is a progression from diversified (sometimes called mixed) farming, where the farmer's intention is to produce goods for sale primarily for widespread consumption by others. The farmer may acquire a sufficiently large amount of arable land and/or sufficiently advanced technology. In advanced countries, there are also investing in expensive capital equipment like tractors, harvesters and so forth. At this point, it may become more profitable for the farmer to specialize and focus on one or a few particular crops due to economies of scale. This may be further augmented by higher levels of technology that might significantly reduce the risk of poor harvests. Thus, the key difference between commercial farming and less-developed forms of farming is the new emphasis on capital formation, scientific progress and technological development, as opposed to a reliance mainly on natural resource utilization that is common to subsistence and diversified farming.

3.4.2 **Types**

There are types of commercial farming:

- Intensive Commercial Farming: A system of farming in which relatively large amounts of capital or labor apply to relatively smaller regions of land. It is practiced in countries where the population pressure is reducing the size of landholdings. The State of West Bengal in India provides one of the best examples of intensive commercial farming.
- Extensive Commercial Farming: It is a system of farming in which relatively small amounts of capital or labor investment apply to relatively large regions of land. At times, the land is left fallow to regain its fertility. It is mostly mechanized as labor is very expensive or may not be available at all. It usually occurs at the margin of the agricultural system, at a great distance from the market or on poor land of limited potential. It is usually practiced in the *tarai* regions of southern Nepal. Crops grown are sugarcane, rice and wheat.
- Plantation Farming: Plantation is a large farm or estate usually in a tropical or sub-tropical country where crops are grown for sale in distant markets rather than local consumption.

3.4.3 Factors

Commercial farming contains six key factors:

1. Location

Commercial farms must move their products to market. Farms need to be located near transportation systems. Ships, trucks, planes, and trains are several ways that products can be moved from where they are grown or made to where customers can buy them.

2. Climate

A farm's soil, as well as the climate of the region in which it is located, determines what crops will grow there or whether the land can support livestock. The temperature and rainfall can also determine the type of crop grown. For example, oranges must be grown in a hot climate. They will not grow if the temperature is too cold.

3. Raw Materials

A commercial farm depends on raw material. For example, a farmer will plant grain to get wheat. A farmer will have dairy cows to produce milk. Seeds and animals are two examples of raw materials used in commercial farming.

4. Market Forces

Supply and demand are important for selling agricultural products. If there is a high demand for a product and low supply, the price will be increased.

5. Labor

People who work on farms provide different types of labor. Labor is needed to plant crops, as well as to harvest them. This is important because some produce, such as grapes, needs to be hand harvested.

6. Transportation

The movement of agricultural products to market depends on transportation systems. For example, produce is shipped by rail in special refrigerated cars, then shipped across the ocean. Some crops. Such as fruit, must get to the market quickly, or else they will rot; crops like these are often shipped shorter distances or are sold in the regions where they are grown.

3.4.4 A Global Network

Modern commercial farming developed out of a global system of commodity exchange established by European colonial powers. As the era of global exploration and colonization by European countries unfolded, new products both agricultural and nonagricultural from the colonial countries became available to a European population that was both growing and becoming more affluent as a result of the Second Agricultural Revolution and the Industrial Revolution. Products from an industrializing Europe made their way to colonies around the world, transportation between source and market was handled by the shipping fleets of the major colonial powers, producing a global pattern of raw materials, manufactured products, and foodstuffs moving between colonies and colonial powers.

3.4.5 Plantations

Plantations—large land holdings devoted to the efficient production of a single tropical or subtropical crop for market—were first established in the 1400s by the Portuguese on islands off the west coast of Africa. Suitable natural environments and plentiful labor led colonial powers to establish plantation- and luxury-crop farming throughout the tropical regions. Such enterprises disrupted traditional practices of subsistence farming, displaced farmers appropriated land, and generally created poverty and hardship for the indigenous population. This pattern remains today even though many plantations are owned not by colonial powers but by the governments of the countries where they are located. Their persistence is largely because poorer countries need the cash generated by these crops. In the late 1990s, the greatest concentration of plantations was in the American tropics.

3.4.6 Rice and Wheat

Most of humanity depends upon the cereal grains for their survival with rice and wheat feeding well over half of the world's population In general, these two key grain crops represent different societies. Rice, originally domesticated in tropical Asia, and still the dominant crop in the south and east realms of that continent, is grown labor-intensively on small plots in poorer countries. Rice production by modern commercial methods is limited to a few countries and the cost of such production often makes it too expensive for many of the poorer countries who need it most.

Wheat, the second most important of the world's grain crops, was domesticated in several locations and lends itself well to commercial production methods. It has come to be associated with Western cultures where it is grown on large land holdings by mechanized means in the richer countries. The principal grain moving in international trade, it is also grown at a subsistence level by millions of farmers as a first or second crop where environment4 circumstances are favorable.

3.4.7 Specialized Farming

The single most important factor in successful agricultural production is climate. This is a specialized form of farming in a dry-summer climate (most climatic regions have wet summers). In the five world regions where this climate prevails a special combination of crops is grown, including grapes, olives, certain vegetables, and others. Many wines come from these regions and, along with other commodities,

are exported to distant markets because Mediterranean products tend to be popular and command high prices.

3.4.8 Two types of farming

At present, there are two main types of farming: subsistence and commercial farming. Subsistence farming is defined as producing food primarily for local consumption (the farmer's family) and most often occurs in developing nations. Commercial farming is the production of crops for sale and is designed to produce crops for widespread distribution (supermarkets), larger markets, and export. It also extends to limited distribution (local produce stands) and any nonfood crops such as cotton and tobacco. It contributes substantially to the gross domestic product of a country.

Commercial farming is found in both the developing, developed, and the most the developed nations. This is now the predominant form of farming in Southeast Asia and throughout the world and includes major fruit plantations in Central America as well as enormous agribusiness wheat farms and facilities in the midwestern United States. In developed countries, farmers are involved in large-scale commercial farming, both rain-fed and under irrigation. In addition, they receive substantial government support aimed at increased domestic production and exports.

Farming was brought into the multilateral trade rules at the conclusion of the Uruguay Round and the establishment of the World Trade Organization (WTO) in 1995. Critics say the agreement tends to emphasize commercial as opposed to subsistence farming.

It is believed that a successful transition to a system of high-yielding commercial farming will open new opportunities for developing countries by allowing farmers to benefit from advanced technologies and expanded trade opportunities. However, not all farmers will gain from these changes. Many small-scale subsistence farmers in more remote regions where the new technologies are less suitable may become more vulnerable and increasingly marginalized.

Since the beginning of the 1990s, there has been a considerable increase in the production of commercial cash crops. There has been a dramatic increase in the land planted to grow annual crops—cotton, jute, sugarcane, peanut, soybean, tobacco—as well as crops planted more than once a year: tea, coffee, rubber, peppers, coconut, and fruit crops. The farming of cattle and pigs has also increased.

3.4.9 Technology

Rapid changes in technology are the characteristic of U.S. farming and a major force of contemporary commercial farming. Agricultural industrialization is a process in which the role of the farm has moved from the centerpiece of agricultural production into being only one part of the system of production. This also includes storage, processing, distribution, marketing, and selling the food. With agricultural industrialization, the farm becomes only one link in a large chain of food production.

In developing countries, mechanization and technological advances are not widely seen. This can be attributed to small land holdings, scattered plots, and poor rural infrastructure. Low income levels and the availability of cheap household labor also discourage households from either purchasing or renting machinery. Despite a government rhetoric encouraging industrialization and modernization, farm mechanization is hampered by a lack of positive government policies such as finance subsidies, low-interest loans for farm machinery, tax exemptions for the manufacturing of machinery and fuel to operate the farm machinery.

Other trends in commercial farming during the 1990s include consumerism, internationalization, environmentalism, policy change, and high technology. Historically, the farmer's main objective was to keep up with the food demand generated by a growing population. However, over time, the population not only requires that basic energy requirements are met, but it is demanding better access to a wider variety of nutritious foods. Today's consumers are very concerned about the nourishment characteristics of the food as well as the safety of the food. With the increasing number of both men and women in the labor force, there is an emphasis on developing new products that not only meet the nourishmental and the safety requirements but also increase the ease and speed of preparation.

Because of the size of the world market, internationalization is one of the fundamental forces affecting the well-being of U.S. farmers. In the international market many of the crops are characterized by: 1) marketing value-added products; 2) developing more alternative crops and more specialty crops; and 3) finding new ways to deliver those to foreign consumers in the form in which they want to buy. We live in a global market and a global society. This creates tremendous opportunities for the U.S. farmer us to draw upon genetic material and new crops from other countries.

The third major trend of the 1990s is increasing concern for the environment. One of the goals is to provide modern farming with the best available, most environmentally friendly irrigation, prevention of soil erosion, and pest control.

The change is in the policy of farming. There has been a decline in the role of "old-line" subsidy programs for corn, soybeans, wheat, cotton, and rice, programs that used to make up the most important elements of the U.S. agricultural policy. Instead, the new agenda is free trade, environmental conciseness, concern for the welfare of the animals that are farmed, and food safety.

Lastly, in the 1990s, farming is becoming an increasingly high-tech industry. There a tremendous array of powerful tools of modern plant science at our disposal used to improve traditional crops through genetic manipulation and to find alternative means of pest control.

3.4.10 Problems

Some problems with commercial farming include overproducing, harvesting fewer varieties of food, and limiting the ability of the small farmer to be able to earn a living.

Overproduction or an oversupply of food because of mass production has had a negative impact on both small and commercial farmers, as it often reduces their incomes. However, government policies often try to control overproduction through different means: paying farmers not to grow cash crops; providing price supports for products that are sold too cheap; and buying surplus production and then storing it, donating it, or destroying it.

With the global spread of commercial farming, fewer varieties of food are being planted in shrinking regions of arable land. Varieties of rice, corn, and wheat and new forms of livestock breeding have displaced many local varieties of crops and animal breeds. The United Nations Food and Agricultural Organization (FAO) has estimated that more than 75 percent of agricultural crop varieties and more than 50 percent of domestic livestock breeds have disappeared over the past century because of modern farming methods. "The spread of modern, commercial farming and the introduction of new varieties of crops has been the main cause of the loss of genetic variety," explains an FAO report. When coupled with the rapid spread of commercial farming, market barriers, and the privatization of knowledge that has accompanied advances in biotechnology, the patenting of life forms poses a direct threat to the livelihoods of farmers and indigenous communities in developing countries.

In Asia, large resettlement schemes, intensive timber harvesting, and the expansion of commercial farming have been important agents of deforestation and forest degradation. The conversion of forest to plantations—both forest plantations and farming plantations of rubber and oil palm—has also been carried out on a large scale.

From a commercial perspective, the world hopes for greater security, protecting fragile environments and reforming local farm policies. To achieve this, developed countries must find less trade-distorting ways to support rural incomes and end the practice of subsidizing their exports. Developing countries need to embrace a similar vision of openness and allow imports as well as exports, as nearly half of global food trade, and virtually all of its growth potential, is among developing countries.

Second, the developed world needs to assist and encourage developing countries to build upon their capacity to participate in a global economy and to ensure that the rural farmers gain from globalization. Developed countries have pledged to reduce global hunger dramatically by increasing aid going to rural development and investing in commercial opportunities for developing country entrepreneurs. If these policies are appropriately supported by agricultural trade consortiums, the investment could increase and broaden the gains in a short amount of time instead of decades.

Finally, attitudes toward new technologies, especially agricultural biotechnology, need to be reexamined. New technologies can raise agricultural productivity and human nourishment at an affordable rate. It would be unfortunate if developing countries were denied these tools by trade barriers disguised as safety or marketing rules unsupported by science.

Review Questions

- 1. Define the Development of Agriculture?
- 2. Explain the Agricultural Production Regions?
- 3. Explain the Rural Land Use?
- 4. Explain the Commercial Agriculture?

Discussion Questions

Discuss the Institutional Perspectives of Indian Agriculture?

Ch-4 Industrialization and Economic Development

Learning Objectives

- To define the Industrialisation.
- To explain the development of industrialization.
- To explain the Impacts of Industrialization.

4.1 Growth and Diffusion of Industrialisation

The **Industrial Revolution** was the transition to new manufacturing processes in the period from about 1760 to sometime between 1820 and 1840. This transition included going from hand production methods to machines, new chemical manufacturing and iron production processes, improved efficiency of water power, the increasing use of steam power and the development of machine tools. It also included the change from wood and other bio-fuels to coal. It began in England and within a few decades had spread to Western Europe and the United States.

The Industrial Revolution marks a major turning point in history; almost every aspect of daily life was influenced in some way. In particular, average income and population began to exhibit unprecedented sustained growth. In the words of Nobel Prize winner Robert E. Lucas, Jr., "For the first time in history, the living standards of the masses of ordinary people have begun to undergo sustained growth ... Nothing remotely like this economic behavior is mentioned by the classical economists, even as a theoretical possibility."

The period of time covered by the Industrial Revolution varies with different historians. Eric Hobsbawm held that it 'broke out' in Britain in the 1780s and was not fully felt until the 1830s or 1840s, while T. S. Ashton held that it occurred roughly between 1760 and 1830.

Some 20th-century historians such as John Clapham and Nicholas Crafts have argued that the process of economic and social change took place gradually and the term *revolution* is a misnomer. This is still a subject of debate among historians. GDP per capita was broadly stable before the Industrial Revolution and the emergence of the modern capitalist economy. The Industrial Revolution began an era of per-capita economic growth in capitalist economies. Economic historians are in agreement that the onset of the Industrial Revolution is the most important event in the history of humanity since the domestication of animals and plants.

The First Industrial Revolution evolved into the Second Industrial Revolution in the transition years between 1840 and 1870, when technological and economic progress gained momentum with the increasing adoption of steam-powered boats, ships and railways, the large scale manufacture of machine tools and the increasing use of steam powered factories.

4.1.1 Etymology

The earliest use of the term "Industrial Revolution" seems to be a letter of 6 July 1799 by French envoy Louis-Guillaume Otto, announcing that France had entered the race to industrialize. In his 1976 book *Keywords: A Vocabulary of Culture and Society*, Raymond Williams states in the entry for "Industry":

"The idea of a new social order based on major industrial change was clear in Southey and Owen, between 1811 and 1818, and was implicit as early as Blake in the early 1790s and Wordsworth at the turn of the [19th] century." The term *Industrial Revolution* applied to technological change was becoming more common by the late 1830s, as in Jérôme-Adolphe Blanqui description in 1837 of *la révolution industrial*. Friedrich Engels in *The Condition of the Working Class in England in 1844* spoke of "an industrial revolution, a revolution which at the same time changed the whole of civil society". However, although Engels wrote in the 1840s, his book was not translated into English until the late nineteenth century, and his expression did not enter everyday language until then. Credit for popularizing the term may be given to Arnold Toynbee, whose lectures given in 1881 gave a detailed account of it.

4.1.2 Major technological developments

The commencement of the Industrial Revolution is closely linked to a small number of innovations, beginning in the second half of the 18th century. By the 1830s the following gains had been made in important technologies:

- **Textiles** Mechanized cotton spinning powered by steam or water increased the output of a worker by a factor of about 1000. The power loom increased the output of a worker by a factor of over 40. The cotton gin increased productivity or removing seeds from cotton by a factor of 50. Large gains in productivity also occurred in spinning and weaving of wool and linen, but they were not as great as in cotton.
- Steam power The efficiency of steam engines increased so that they used between one-fifth and one-tenth as much fuel. The adoption of stationary steam engines in rotary motion made them suitable for industrial uses. The high pressure engine had a high power to weight ratio, making it suitable for transportation. Steam power underwent a rapid expansion after 1800.
- **Iron making** The substitution of coke for charcoal greatly lowered the fuel cost of pig iron and wrought iron production. Using coke also allowed larger blast furnaces, resulting in economies of scale. The cast iron blowing cylinder was first used in 1760. It was later improved by making it double acting, which allowed higher furnace temperatures. The puddling process produced a structural grade iron at a lower cost than the finery forge. The rolling mill was fifteen times faster than hammering wrought iron. Hot blast (1829) greatly increased fuel efficiency in iron production in the following decades.

4.1.3 Textile manufacture

In the late 17th and early 18th centuries the British government passed a series of Calico Acts in order to protect the domestic woolen industry from the increasing amounts of cotton fabric that were being imported from East India.

There was also a demand for heavier fabric, which was met by a domestic industry around Lancashire that produced fustian, a cloth with flax warp and cotton weft. Flax was used for the warp because wheel spun cotton did not have sufficient strength, but the resulting blend was not as soft as 100% cotton and was more difficult to sew.

Spinning and weaving were done in households, for domestic consumption and as a cottage industry under the putting-out system. Occasionally the work was done in the workshop of a master weaver. Under the putting-out system, home based workers produced under contract to merchant sellers, who often supplied the raw materials. During the off season the women, typically farmers' wives, did the spinning and the men did the weaving. Using the spinning wheel, it took anywhere from four to eight spinners to supply one hand loom weaver. The flying shuttle patented in 1733 by John Kay, with a number of subsequent improvements including an important one in 1747, doubled the output of a weaver, worsening the imbalance between spinning and weaving. It became widely used around Lancashire after 1760 when Robert Kay, John's son, invented the drop box.

Lewis Paul patented the roller spinning machine and the flyer-and-bobbin system for drawing wool to a more even thickness, developed with the help of John Wyatt in Birmingham. Paul and Wyatt opened a mill in Birmingham which used their new rolling machine powered by a donkey. In 1743, a factory was opened in Northampton with fifty spindles on each of five of Paul and Wyatt's machines. This operated until about 1764. A similar mill was built by Daniel Bourn in Leominster, but this burnt down. Both Lewis Paul and Daniel Bourn patented carding machines in 1748. Using two sets of rollers that travelled at different speeds, it was later used in the first cotton spinning mill. Lewis's invention was later developed and improved by Richard Arkwright in his water frame and Samuel Crompton in his spinning mule.

In 1764 in the village of Stanhill, Lancashire, James Hargreaves invented the spinning jenny, which he patented in 1770. It was the first practical spinning frame with multiple spindles. The jenny worked in a similar manner to the spinning wheel, by first clamping down on the fibers, then by drawing them out, followed by twisting. It was a simple, wooden framed machine that only cost about £6 for a 40 spindle model in 1792, and was used mainly by home spinners. The jenny produced a lightly twisted yarn only suitable for weft, not warp.

The spinning frame or water frame was developed by Richard Arkwright who, along with two partners, patented it in 1769. The design was partly based on a spinning machine built for Thomas High by clock maker John Kay, who was hired by Arkwright. For each spindle, the water frame used a series of four pairs of rollers, each operating at a successively higher rotating speed, to draw out the fiber, which was then twisted by the spindle. The roller spacing was slightly longer than the fiber length. Too close a spacing caused the fibers to break while too distant a spacing caused uneven thread. The top rollers were leather covered and loading on the rollers was applied by a weight. The weights kept the twist from backing up before the rollers. The bottom rollers were wood and metal, with fluting along the length. The water frame was able to produce a hard, medium count thread suitable for warp, finally allowing 100% cotton cloth to be made in Britain. A horse powered the first factory to use the spinning frame. Water power was used by Arkwright and partners at a factory in Cromford, Derbyshire in 1771, giving the invention its name.

Samuel Crompton's Spinning Mule, introduced in 1779, was a combination of the spinning jenny and the water frame in which the spindles were placed on a carriage, which went through an operational sequence during which the rollers stopped while the carriage moved away from the drawing roller to finish drawing out the fibers as the spindles started rotating. Crompton's mule was able to produce finer thread than hand spinning and at a lower cost. Mule spun thread was of suitable strength to be used as warp, and finally allowed Britain to produce good quality calico cloth.

Realizing that the expiration of the Arkwright patent would greatly increase the supply of spun cotton and lead to a shortage of weavers, Edmund Cartwright developed a vertical power loom which he patented in 1785. In 1776 he patented a two man operated loom, that was more conventional. Cartwright built two

factories; the first burned down and the second was sabotaged by his workers. Cartwright's loom design had several flaws, the most serious being thread breakage. Samuel Horrocks patented a fairly successful loom in 1813. Horock's loom was improved by Richard Roberts in 1822 and these were produced in large numbers by Roberts, Hill & Co.

The demand for cotton presented an opportunity to planters in the Southern United States, who thought upland cotton would be a profitable crop if a better way could be found to remove the seed. Eli Whitney responded to the challenge by inventing the cotton gin, an inexpensive device. With a cotton gin a man could remove seed from as much upland cotton in one day as would have previously taken a woman working two months to process at one pound per day.

Other inventors increased the efficiency of the individual steps of spinning (carding, twisting and spinning, and rolling) so that the supply of yarn increased greatly, which fed a weaving industry that was advancing with improvements to shuttles and the loom or 'frame'. The output of an individual laborer increased dramatically, with the effect that the new machines were seen as a threat to employment, and early innovators were attacked and their inventions destroyed.

To capitalize upon these advances, it took a class of entrepreneurs, of which the most famous is Richard Arkwright. He is credited with a list of inventions, but these were actually developed by people such as Thomas Highs and John Kay; Arkwright nurtured the inventors, patented the ideas, financed the initiatives, and protected the machines. He created the cotton mill which brought the production processes together in a factory, and he developed the use of power—first horse power and then water power which made cotton manufacture a mechanized industry. Before long steam power was applied to drive textile machinery. Manchester acquired the nickname Cottonopolis during the early 19th century owing to its sprawl of textile factories.

4.1.4 Metallurgy

A major change in the metal industries during the era of the Industrial Revolution was the replacement of wood and other bio-fuels with coal. For a given amount of heat, coal required much less labor to mine than cutting wood, and coal was more abundant than wood.

Use of coal in smelting started somewhat before the Industrial Revolution, based on innovations by Sir Clement Clerke and others from 1678, using coal reverberatory furnaces known as cupolas. These were operated by the flames playing on the ore and charcoal or coke mixture, reducing the oxide to metal. This has the advantage that impurities (such as sulfur ash) in the coal do not migrate into the metal. This technology was applied to lead from 1678 and to copper from 1687. It was also applied to iron foundry work in the 1690s, but in this case the reverberatory furnace was known as an air furnace. The foundry cupola is a different (and later) innovation.

This was followed by Abraham Darby, who made great strides using coke to fuel his blast furnaces at Coalbrookdale in 1709. However, the coke pig iron he made was used mostly for the production of castiron goods such as pots and kettles. He had the advantage over his rivals in that his pots, cast by his patented process, were thinner and cheaper than theirs. Coke pig iron was hardly used to produce bar iron in forges until the mid-1750s, when his son Abraham Darby II built Horsehay and Ketley furnaces (not far from Coalbrookdale). By then, coke pig iron was cheaper than charcoal pig iron. Since cast iron was becoming cheaper and more plentiful, it began being a structural material following the building of the innovative Iron Bridge in 1778 by Abraham Darby III. Bar iron for smiths to forge into consumer goods was still made in finery forges, as it long had been. However, new processes were adopted in the ensuing years. The first is referred to today as potting and stamping, but this was superseded by Henry Cort's puddling process. From 1785, perhaps because the improved version of potting and stamping was about to come out of patent, a great expansion in the output of the British iron industry began. The new processes did not depend on the use of charcoal at all and were therefore not limited by charcoal sources.

Henry Cort developed two significant iron manufacturing processes: rolling in 1783 and puddling in 1784. Rolling replaced hammering for consolidating wrought iron and expelling some of the dross. Rolling was 15 times faster than hammering with a trip hammer. Puddling produced a structural grade iron at a relatively low cost.

Puddling was a means of decarburizing pig iron by slow oxidation, with iron ore as the oxygen source, as the iron was manually stirred using a long rod. The decarburized iron, having a higher melting point than cast iron, was raked into globs by the paddler. When the glob was large enough the puddler would remove it. Puddling was backbreaking and extremely hot work. Few puddlers lived to be 40. Puddling was done in a reverberatory furnace, allowing coal or coke to be used as fuel. The puddling process continued to be used until the late 19th century when iron was being displaced by steel. Because puddling required human skill in sensing the iron globs, it was never successfully mechanized.

Up to that time, British iron manufacturers had used considerable amounts of imported iron to supplement native supplies. This came principally from Sweden from the mid-17th century and later also from Russia from the end of the 1720s. However, from 1785, imports decreased because of the new iron making technology, and Britain became an exporter of bar iron as well as manufactured wrought iron consumer goods.

Two decades before the Industrial Revolution an improvement was made in the production of steel, which was an expensive commodity and used only where iron would not do, such as for cutting edge tools and for springs. Benjamin Huntsman developed his crucible steel technique in the 1740s. The raw material for this was blister steel, made by the cementation process.

The supply of cheaper iron and steel aided a number of industries such as those making nails, hinges, wire and other hardware items. The development of machine tools allowed better working of iron, causing it to be increasingly used in the rapidly growing machinery and engine industries.

4.1.5 Mining

Coal mining in Britain, particularly in South Wales started early. Before the steam engine, pits were often shallow bell pits following a seam of coal along the surface, which were abandoned as the coal was extracted. In other cases, if the geology was favorable, the coal was mined by means of an adit or a drift mine driven into the side of a hill. Shaft mining was done in some regions, but the limiting factor was the problem of removing water. It could be done by hauling buckets of water up the shaft or to a sough (a tunnel driven into a hill to drain a mine). In either case, the water had to be discharged into a stream or ditch at a level where it could flow away by gravity. The introduction of the steam pump by Savery in 1698 and the Newcomen steam engine in 1712 greatly facilitated the removal of water and enabled shafts to be made deeper, enabling more coal to be extracted. These were developments that had begun before the Industrial Revolution, but the adoption of John Smeaton's improvements to the Newcomen engine followed by James Watt's more efficient steam engines from the 1770s reduced the fuel costs of engines, making mines more profitable.

Coal mining was very dangerous owing to the presence of firedamp in many coal seams. Some degree of safety was provided by the safety lamp which was invented in 1816 by Sir Humphry Davy and independently by George Stephenson. However, the lamps proved a false dawn because they became unsafe very quickly and provided a weak light. Firedamp explosions continued, often setting off coal dust explosions, so casualties grew during the entire 19th century. Circumstances of work were very poor, with a high casualty rate from rock falls.

4.1.6 Steam power

The development of the stationary steam engine was an important element of the Industrial Revolution; however, for most of the period of the Industrial Revolution, the majority of industrial power was supplied by water and wind. In Britain by 1800 an estimated 10,000 horsepower was being supplied by steam. By 1815 steam power had grown to 210,000 hp. Small power requirements continued to be provided by animal and human muscle until the late 19th century.

The first real attempt at industrial use of steam power was due to Thomas Savery in 1698. He constructed and patented in London a low-lift combined vacuum and pressure water pump, that generated about one horsepower (hp) and was used in numerous water works and tried in a few mines (hence its "brand name", *The Miner's Friend*). The Savery's pump was economical in small horsepower ranges, but was prone to boiler explosions in larger sizes. Savery pumps continued to be produced until the late 18th century.

The first safe and successful steam power plant was introduced by Thomas Newcomen before 1712. Newcomen apparently conceived the Newcomen steam engine quite independently of Savery, but as the latter had taken out a very wide-ranging patent, Newcomen and his associates were obliged to come to an arrangement with him, marketing the engine until 1733 under a joint patent. Newcomen's engine appears to have been based on Papin's experiments carried out 30 years earlier, and employed a piston and cylinder, one end of which was open to the atmosphere above the piston. Steam just above atmospheric pressure (all that the boiler could stand) was introduced into the lower half of the cylinder beneath the piston during the gravity-induced upstroke; the steam was then condensed by a jet of cold water injected into the steam space to produce a partial vacuum; the pressure differential between the atmosphere and the vacuum on either side of the piston displaced it downwards into the cylinder, raising the opposite end of a rocking beam to which was attached a gang of gravity-actuated reciprocating force pumps housed in the mineshaft. The engine's downward power stroke raised the pump, priming it and preparing the pumping stroke. At first the phases were controlled by hand, but within ten years an escapement mechanism had been devised worked by a vertical *plug tree* suspended from the rocking beam which rendered the engine self-acting.

A number of Newcomen engines were successfully put to use in Britain for draining hitherto unworkable deep mines, with the engine on the surface; these were large machines, requiring a lot of capital to build, and produced about 5 hp (3.7 kW). They were extremely inefficient by modern standards, but when located where coal was cheap at pit heads, opened up a great expansion in coal mining by allowing mines to go deeper. Despite their disadvantages, Newcomen engines were reliable and easy to maintain and continued to be used in the coal-fields until the early decades of the 19th century. By 1729, when Newcomen died, his engines had spread (first) to Hungary in 1722, Germany, Austria, and Sweden. A total of 110 are known to have been built by 1733 when the joint patent expired, of which 14 were abroad. In the 1770s, the engineer John Smeaton built some very large examples and introduced a number of improvements. A total of 1,454 engines had been built by 1800.

A fundamental change in working principles was brought about by James Watt. In close collaboration with Matthew Boulton, he had succeeded by 1778 in perfecting his steam engine, which incorporated a series of radical improvements, notably the closing off of the upper part of the cylinder thereby making the low pressure steam drive the top of the piston instead of the atmosphere, use of a steam jacket and the celebrated separate steam condenser chamber. The separate condenser did away with the cooling water that had been injected directly into the cylinder, which cooled the cylinder and wasted steam. Likewise, the steam jacket kept steam from condensing in the cylinder, also improving efficiency. These improvements increased engine efficiency so that Boulton & Watts engines used only 20-25% as much coal per horsepower-hour as Newcomen's. Bolton and Watt opened the Soho Foundry, for the manufacture of such engines, in 1795.

Nor could the atmospheric engine be easily adapted to drive a rotating wheel, although Wasborough and Pickard did succeed in doing so towards 1780. However by 1783 the more economical Watt steam engine had been fully developed into a double-acting rotative type, which meant that it could be used to directly drive the rotary machinery of a factory or mill. Both of Watt's basic engine types were commercially very successful, and by 1800, the firm Boulton & Watt had constructed 496 engines, with 164 driving reciprocating pumps, 24 serving blast furnaces, and 308 powering mill machinery; most of the engines generated from 5 to 10 hp (7.5 kW).

The development of machine tools, such as the lathe, planing and shaping machines powered by these engines, enabled all the metal parts of the engines to be easily and accurately cut and in turn made it possible to build larger and more powerful engines.

Until about 1800, the most common pattern of steam engine was the beam engine, built as an integral part of a stone or brick engine-house, but soon various patterns of self-contained portative engines (readily removable, but not on wheels) were developed, such as the table engine. Around the start of the 19th century, the Cornish engineer Richard Trevithick, and the American, Oliver Evans began to construct higher pressure non-condensing steam engines, exhausting against the atmosphere. This allowed an engine and boiler to be combined into a single unit compact enough to be used on mobile road and rail locomotives and steam boats.

In the early 19th century after the expiration of Watt's patent, the steam engine underwent many improvements by a host of inventors and engineers.

4.1.7 Chemicals

The large scale production of chemicals was an important development during the Industrial Revolution. The first of these was the production of sulphuric acid by the lead chamber process invented by the Englishman John Roebuck (James Watt's first partner) in 1746. He was able to greatly increase the scale of the manufacture by replacing the relatively expensive glass vessels formerly used with larger, less expensive chambers made of riveted sheets of lead. Instead of making a small amount each time, he was able to make around 100 pounds (50 kg) in each of the chambers, at least a tenfold increase.

The production of an alkali on a large scale became an important goal as well, and Nicolas Leblanc succeeded in 1791 in introducing a method for the production of sodium carbonate. The Leblanc process was a reaction of sulphuric acid with sodium chloride to give sodium sulphate and hydrochloric acid. The sodium sulphate was heated with limestone (calcium carbonate) and coal to give a mixture of sodium carbonate and calcium sulphide. Adding water separated the soluble sodium carbonate from the calcium sulphide. The process produced a large amount of pollution (the hydrochloric acid was initially vented to the air, and calcium sulphide was a useless waste product). Nonetheless, this synthetic soda ash proved

economical compared to that from burning specific plants (Barilla) or from kelp, which were the previously dominant sources of soda ash, and also to potash (potassium carbonate) derived from hardwood ashes.

These two chemicals were very important because they enabled the introduction of a host of other inventions, replacing many small-scale operations with more cost-effective and controllable processes. Sodium carbonate had many uses in the glass, textile, soap, and paper industries. Early uses for sulphuric acid included pickling (removing rust) iron and steel, and for bleaching cloth.

The development of bleaching powder (calcium hypochlorite) by Scottish chemist Charles Tennant in about 1800, based on the discoveries of French chemist Claude Louis Berthollet, revolutionized the bleaching processes in the textile industry by dramatically reducing the time required (from months to days) for the traditional process then in use, which required repeated exposure to the sun in bleach fields after soaking the textiles with alkali or sour milk. Tennant's factory at St Rollox, North Glasgow, became the largest chemical plant in the world.

In 1824 Joseph Aspdin, a British brick layer turned builder, patented a chemical process for making Portland cement which was an important advance in the building trades. This process involves sintering a mixture of clay and limestone to about 1,400 °C (2,552 °F), then grinding it into a fine powder which is then mixed with water, sand and gravel to produce concrete. Portland cement was used by the famous English engineer Marc Isambard Brunel several years later when constructing the Thames Tunnel. Cement was used on a large scale in the construction of the London sewerage system a generation later.

After 1860 the focus on chemical innovation was in dyestuffs, and Germany took world leadership, building a strong chemical industry. Aspiring chemists flocked to German universities in the 1860–1914 era to learn the latest techniques. British scientists by contrast, lacked research and universities did not train advanced students; instead, the practice was to hire German-trained chemists.

4.1.8 Machine tools

The Industrial Revolution created a demand for metal parts used in machinery. This led to the development of several machine tools for cutting metal parts. They had their origins in the tools developed in the 18th century by makers of clocks and watches and scientific instrument makers to enable them to batch-produce small mechanisms.

Before the advent of machine tools, metal was worked manually using the basic hand tools of hammers, files, scrapers, saws and chisels. Consequently, the use of metal was kept to a minimum. Wooden components had the disadvantage of changing dimensions with temperature and humidity, and the various joints tended to rack (work loose) over time. As the Industrial Revolution progressed, machines with metal parts and frames became more common. Hand methods of production were very laborious and costly and precision was difficult to achieve.

Pre-industrial machinery was built by various craftsmen—millwrights built water and wind mills, carpenters made wooden framing, and smiths and turners made metal parts.

The first large machine tool was the cylinder boring machine used for boring the large-diameter cylinders on early steam engines. The planing machine, the slotting machine and the shaping machine were developed in the early decades of the 19th century. Although the milling machine was invented at this time, it was not developed as a serious workshop tool until somewhat later in the 19th century.

Military production, as well, had a hand in the development of machine tools. Henry Maudslay, who trained a school of machine tool makers early in the 19th century, was employed at the Royal Arsenal, Woolwich, as a young man where he would have seen the large horse-driven wooden machines for cannon boring made and worked by the Verbruggans. He later worked for Joseph Bramah on the production of metal locks. Bramah patented a lathe that had similarities to the slide rest lathe. Maudslay perfected the slide rest lathe, which could cut machine screws of variable pitches using changeable gears between the spindle and the lead screw. Before its invention screws could not be cut to any precision using various earlier lathe designs, some of which copied from a template. The Maudslay's lathe was called one history's most important inventions.

Maudslay left Bramah's employment and set up his own shop. He was engaged to build the machinery for making ships' pulley blocks for the Royal Navy in the Portsmouth Block Mills. These machines were all metal and were the first machines for mass production and making components with a degree of interchangeability. The lessons Maudslay learned about the need for stability and precision he adapted to the development of machine tools, and in his workshops he trained a generation of men to build on his work, such as Richard Roberts, Joseph Clement and Joseph Whitworth.

James Fox of Derby had a healthy export trade in machine tools for the first third of the century, as did Matthew Murray of Leeds. Roberts was a maker of high-quality machine tools and a pioneer of the use of jigs and gauges for precision workshop measurement.

In the half century following the invention of the fundamental machine tools the machinery industry would become the largest segment of the economy, by value added, in the U.S.

4.1.9 Gas lighting

Another major industry of the later Industrial Revolution was gas lighting. Though others made a similar innovation elsewhere, the large scale introduction of this was the work of William Murdoch, an employee of Boulton and Watt, the Birmingham steam engine pioneers. The process consisted of the large scale gasification of coal in furnaces, the purification of the gas (removal of sulphur, ammonia, and heavy hydrocarbons), and its storage and distribution. The first gas lighting utilities were established in London between 1812 and 1820. They soon became one of the major consumers of coal in the UK. Gas lighting had an impact on the social and industrial organization because it allowed factories and stores to remain open longer than with tallow candles or oil. Its introduction allowed night life to flourish in cities and towns as interiors and streets could be lighted on a larger scale than before.

4.1.10Glass

A new method of producing glass, known as the cylinder process, was developed in Europe during the early 19th century. In 1832, this process was used by the Chance Brothers to create sheet glass. They became the leading producers of window and plate glass. This advancement allowed for larger panes of glass to be created without interruption, thus freeing up the space planning in interiors as well as the fenestration of buildings. The Crystal Palace is the supreme example of the use of sheet glass in a new and innovative structure..

4.1.11 Paper machine

A machine for making a continuous sheet of paper on a loop of wire fabric was patented in 1798 by Nicholas Louis Robert who worked for Saint-Léger Didot family in France. The paper machine is known

as a Fourdrinier after the financiers, brothers Sealy and Henry Fourdrinier, who were stationers in London. Although greatly improved and with many variations, the Fourdriner machine is the predominant means of paper production today.

The method of continuous production demonstrated by the paper machine influenced the development of other continuous rolling and other continuous production processes.

4.1.12 Farming

The invention of machinery played a big part in driving forward the British Agricultural Revolution. Agricultural improvement began in the centuries before the Industrial revolution got going and it may have played a part in freeing up labor from the land to work in the new industrial mills of the 18th century. As the revolution in industry progressed a succession of machines became available which increased food production with ever fewer laborers.

Jethro Tull's seed drill invented in 1701 was a mechanical seeder which distributed seeds efficiently across a plot of land. This was important because the yield of seeds harvested to seeds planted at that time was around four or five. Joseph Foljambe's Rotherham plough of 1730, was the first commercially successful iron plough. The threshing machine, invented by Andrew Meikle in 1784, displaced hand threshing with a flail, a laborious job that took about one-quarter of agricultural labor. It took several decades to diffuse and was the final straw for many farm laborers, who faced near starvation, leading to the 1830 agricultural rebellion of the Swing Riots.

4.1.13 Other developments

Other developments included more efficient water wheels, based on experiments conducted by the British engineer John Smeaton the beginnings of a machinery industry and the rediscovery of concrete (based on hydraulic lime mortar) by John Smeaton, which had been lost for 1300 years.

4.1.14 Transportation

At the beginning of the Industrial Revolution, inland transport was by navigable rivers and roads, with coastal vessels employed to move heavy goods by sea. Railways or wagon ways were used for conveying coal to rivers for further shipment, but canals had not yet been constructed. Animals supplied all of the motive power on land, with sails providing the motive power on the sea.

The Industrial Revolution improved Britain's transport infrastructure with a turnpike road network, a canal and waterway network, and a railway network. Raw materials and finished products could be moved more quickly and cheaply than before. Improved transportation also allowed new ideas to spread quickly.

4.1.15 Canals

The building of canals dates to ancient times. The Grand Canal in China, "the world's largest artificial waterway and oldest canal still in existence," parts of which were started between the 6th and 4th centuries BC, is 1,121 miles (1,804 km) long and links Hangzhou to Beijing.

Canals were the first technology to allow bulk materials to be easily transported across the country, coal being a common commodity. A single canal horse could pull a load dozens of times larger than a cart at a faster pace.

Canals began to be built in the late 18th century to link the major manufacturing centers across the country. Known for its huge commercial success, the Bridgewater Canal in North West England, which opened in 1761 and was mostly funded by The 3rd Duke of Bridgewater. From Worsley to the rapidly growing town of Manchester its construction cost £168,000 (£21,920,770 as of 2013), but its advantages over land and river transport meant that within a year of its opening in 1761, the price of coal in Manchester fell by about half. This success helped inspire a period of intense canal building, known as Canal Mania. New canals were hastily built with the aim of replicating the commercial success of the Bridgewater Canal, the most notable being the Leeds and Liverpool Canal and the Thames and Severn Canal which opened in 1774 and 1789 respectively.

By the 1820s, a national network was in existence. Canal construction served as a model for the organization and methods later used to construct the railways. They were eventually largely superseded as profitable commercial enterprises by the spread of the railways from the 1840s on. The last major canal to be built in the United Kingdom was the Manchester Ship Canal, which upon opening in 1894 was the largest ship canal in the world, and opened Manchester as a port. However it never achieved the commercial success its sponsors had hoped for and signalled canals as a dying mode of transport in an age dominated by railways, which were quicker and often cheaper.

Britain's canal network, together with its surviving mill buildings, is one of the most enduring features of the early Industrial Revolution to be seen in Britain.

4.1.16 Roads

Much of the original British road system was poorly maintained by thousands of local parishes, but from the 1720s (and occasionally earlier) turnpike trusts were set up to charge tolls and maintain some roads. Increasing numbers of main roads were turnpiked from the 1750s to the extent that almost every main road in England and Wales was the responsibility of a turnpike trust. New engineered roads were built by John Metcalf, Thomas Telford and most notably John McAdam, with the first 'macadamized' stretch of road being Marsh Road at Ashton Gate, Bristol in 1816. The major turnpikes radiated from London and were the means by which the Royal Mail was able to reach the rest of the country. Heavy goods transport on these roads was by means of slow, broad wheeled, carts hauled by teams of horses. Lighter goods were conveyed by smaller carts or by teams of pack horses. Stage coaches carried the rich, and the less wealthy could pay to ride on carriers carts.

4.1.17 Railways

Wagonways for moving coal in the mining regions had started in the 17th century and were often associated with canal or river systems for the further movement of coal. These were all horse drawn or relied on gravity, with a stationary steam engine to haul the wagons back to the top of the incline. The first applications of the steam locomotive were on wagon or plate ways (as they were then often called from the cast-iron plates used). Horse-drawn public railways did not begin until the early years of the 19th century. Steam-hauled public railways began with the Stockton and Darlington Railway in 1825.

On 15 September 1830, the Liverpool and Manchester Railway was opened, the first inter-town railway in the world and was attended by the Prime Minister, the Duke of Wellington. The railway was engineered by Joseph Locke and George Stephenson, linked the rapidly expanding industrial town of

Manchester with the port town of Liverpool. The opening was marred by problems, due to the primitive nature of the technology being employed, however problems were gradually ironed out and the railway became highly successful, transporting passengers and freight. The success of the inter-town railway, particularly in the transport of freight and commodities, led to Railway Mania.

Construction of major railways connecting the larger cities and towns began in the 1830s but only gained momentum at the very end of the first Industrial Revolution. After many of the workers had completed the railways, they did not return to their rural lifestyles but instead remained in the cities, providing additional workers for the factories.

4.1.18 Standards of living

The history of the change of living circumstances during the industrial revolution has been very controversial, and was the topic that from the 1950s to the 1980s caused most heated debate among economic and social historians. A series of 1950s essays by Henry Phelps Brown and Sheila V. Hopkins later set the academic consensus that the bulk of the population, that was at the bottom of the social ladder, suffered severe reductions in their living standards.

During the period 1813–1913, there was a significant increase in worker wages.

4.1.19 Food and nourishment

Chronic hunger and malnourishment were the norm for the majority of the population of the world including Britain and France, until the latter part of the 19th century. Until about 1750, in large part due to malnourishment, life expectancy in France was about 35 years, and only slightly higher in Britain. The U.S. population of the time was adequately fed, were much taller and had a life expectancy of 45–50 years.

In Britain and the Netherlands food supply had been increasing and prices falling before the Industrial Revolution due to better agricultural practices; however, the population was increasing as well, as noted by Thomas Malthus. Prior to the Industrial Revolution, advances in farming or technology soon led to an increase in population, which again strained food and other resources, limiting increases in per capita income. This condition is called the Malthusian trap, and it was finally overcome by industrialization.

Transportation improvements, such as canals and improved roads, also lowered food costs. Railroads were introduced near the end of the Industrial Revolution.

4.1.20 Housing

Living circumstances during the Industrial Revolution varied from the splendor of the homes of the owners to the squalor of the lives of the workers.

In *The Condition of the Working Class in England* in 1844 Friedrich Engels described Backstreet sections of Manchester and other mill towns where people lived in crude shanties and shacks, some not being completely enclosed, some with dirt floors. These shantytowns had narrow walkways between irregularly shaped lots and dwellings. Sanitary facilities were nonexistent. These slum regions had extremely high population densities. It was common for groups of unrelated mill workers to share rooms in very low quality housing where eight to ten people may occupy a single room, which often had no furniture, with the occupants sleeping on a pile of straw or sawdust.

These homes would share toilet facilities, have open sewers and would be at risk of developing pathologies associated with persistent dampness. The disease was spread through a contaminated water supply. Circumstances did improve during the 19th century as public health acts were introduced covering things such as sewage, hygiene and making some boundaries upon the construction of homes. Not everybody lived in homes like these. The Industrial Revolution created a larger middle class of professionals such as lawyers and doctors. Health circumstances improved over the course of the 19th century because of better sanitation; the famines that troubled rural regions did not happen in industrial regions. However, urban people—especially small children—died due to diseases spreading through the cramped living circumstances. Tuberculosis (spread in congested dwellings), lung diseases from the mines, cholera from polluted water and typhoid were also common.

In the introduction of the 1892 edition of Engels (1844) he notes that most of the circumstances he wrote about in 1844 had been greatly improved.

4.1.21 Clothing and consumer goods

Consumers benefited from falling prices for clothing and household articles such as cast iron cooking utensils, and in the following decades, stoves for cooking and space heating.

4.1.22 **Population increase**

According to Robert Hughes in *The Fatal Shore*, the population of England and Wales, which had remained steady at 6 million from 1700 to 1740, rose dramatically after 1740. The population of England had more than doubled from 8.3 million in 1801 to 16.8 million in 1850 and, by 1901, had nearly doubled again to 30.5 million. As living circumstances and health care improved during the 19th century, Britain's population doubled every 50 years. Europe's population increased from about 100 million in 1700 to 400 million by 1900.

4.1.23 Labor circumstances

4.1.23.1 Social structure and working circumstances

In terms of social structure, the Industrial Revolution witnessed the triumph of a middle class of industrialists and businessmen over a landed class of nobility and gentry. Ordinary working people found increased opportunities for employment in the new mills and factories, but these were often under strict working circumstances with long hours of labor dominated by a pace set by machines. As late as the year 1900, most industrial workers in the United States still worked a 10-hour day (12 hours in the steel industry), yet earned from 20 to 40 percent less than the minimum deemed necessary for a decent life. However, harsh working circumstances were prevalent long before the Industrial Revolution took place. Pre-industrial society was very static and often cruel—child labor, dirty living circumstances, and long working hours were just as prevalent before the Industrial Revolution.

4.1.23.2 Factories and urbanization

Industrialisation led to the creation of the factory. Arguably the first was John Lombe's water-powered silk mill in Derby, operational by 1721. However, the rise of the factory came somewhat later when cotton spinning was mechanized.

The factory system was largely responsible for the rise of the modern town, as large numbers of workers migrated into the cities in search of employment in the factories. Nowhere was this better illustrated than the mills and associated industries of Manchester, nicknamed "Cottonopolis", and the world's first industrial town.

For much of the 19th century, production was done in small mills, which were typically water-powered and built to serve local needs. Later each factory would have its own steam engine and a chimney to give an efficient draft through its boiler.

The transition to industrialization was not without difficulty. For example, a group of English workers known as Luddites formed to protest against industrialisation and sometimes sabotaged factories.

In other industries the transition to factory production was not so divisive. Some industrialists themselves tried to improve factory and living circumstances for their workers. One of the earliest such reformers was Robert Owen, known for his pioneering efforts in improving circumstances for workers at the New Lanark mills, and often regarded as one of the key thinkers of the early socialist movement.

By 1746, an integrated brass mill was working at Warmley near Bristol. Raw material went in at one end, was smelted into brass and was turned into pans, pins, wire, and other goods. Housing was provided for workers on site. Josiah Wedgwood and Matthew Boulton (whose Soho Manufactory was completed in 1766) were other prominent early industrialists, who employed the factory system.

4.1.23.3 Child Labor

The Industrial Revolution led to a population increase, but the chances of surviving childhood did not improve throughout the Industrial Revolution (although *infant* mortality rates were reduced markedly). There was still limited opportunity for education, and children were expected to work. Employers could pay a child less than an adult even though their productivity was comparable; there was no need for strength to operate an industrial machine, and since the industrial system was completely new there were no experienced adult laborers. This made child labor the labor of choice for manufacturing in the early phases of the Industrial Revolution between the 18th and 19th centuries. In England and Scotland in 1788, two-thirds of the workers in 143 water-powered cotton mills were described as children.

Child labor had existed before the Industrial Revolution, but with the increase in population and education it became more visible. Many children were forced to work in relatively bad circumstances for much lower pay than their elders, 10-20% of an adult male's wage. Children as young as four were employed. Beatings and long hours were common, with some child coal miners and hurriers working from 4 am until 5 pm. Circumstances were dangerous, with some children killed when they dozed off and fell into the path of the carts, while others died from gas explosions. Many children developed lung cancer and other diseases and died before the age of 25. Workhouses would sell orphans and abandoned children as "pauper apprentices", working without wages for board and lodging. Those who ran away would be whipped and returned to their masters, with some masters shackling them to prevent escape. Children employed as mule scavenger by cotton mills would crawl under machinery to pick up cotton, working 14 hours a day, six days a week. Some lost hands or limbs, others were crushed under the machines, and some were decapitated. Young girls worked in match factories, where phosphorus fumes would cause many to develop phossy jaw. Children employed at Glassworks were regularly burned and blinded, and those working at potteries were vulnerable to poisonous clay dust.

Reports were written detailing some of the abuses, particularly in the coal mines and textile factories and these helped to popularize the children's plight. The public outcry, especially among the upper and middle classes, helped stir change in the young workers' welfare.

Politicians and the government tried to limit child labor by law, but factory owners resisted; some felt that they were aiding the poor by giving their children money to buy food to avoid starvation, and others simply welcomed the cheap labor. In 1833 and 1844, the first general laws against child labor, the Factory Acts, were passed in Britain: Children younger than nine were not allowed to work, children were not permitted to work at night, and the work day of youth under the age of 18 was limited to twelve hours. Factory inspectors supervised the execution of the law, however, their scar town made enforcement difficult. About ten years later, the employment of children and women in mining was forbidden. These laws decreased the number of child laborers; however, child labor remained in Europe and the United States up to the 20th century.

4.1.23.4 Luddites

The rapid industrialization of the English economy cost many craft workers their jobs. The movement started first with lace and hosiery workers near Nottingham and spread to other regions of the textile industry owing to early industrialisation. Many weavers also found themselves suddenly unemployed since they could no longer compete with machines which only required relatively limited (and unskilled) labor to produce more cloth than a single weaver. Many such unemployed workers, weavers and others, turned their animosity towards the machines that had taken their jobs and began destroying factories and machinery. These attackers became known as Luddites, supposedly followers of Ned Ludd, a folklore figure. The first attacks of the Luddite movement began in 1811. The Luddites rapidly gained popularity, and the British government took drastic measures, using the militia or army to protect industry. Those rioters who were caught were tried and hanged, or transported for life.

Unrest continued in other sectors as they industrialized as well, such as with agricultural laborers in the 1830s when large parts of southern Britain were affected by the Captain Swing disturbances. Threshing machines were a particular target, and hayrick burning was a popular activity. However, the riots led to the first formation of trade unions, and further pressure for reform.

4.1.23.5 Organization of Labor

The Industrial Revolution concentrated labor into mills, factories and mines, thus facilitating the organization of *combinations* or trade unions to help advance the interests of working people. The power of a union could demand better terms by withdrawing all labor and causing a consequent cessation of production. Employers had to decide between giving in to the union demands at a cost to themselves or suffering the cost of the lost production. Skilled workers were hard to replace, and these were the first groups to successfully advance their circumstances through this kind of bargaining.

The main method the unions used to effect change was strike action. Many strikes were painful events for both sides, the unions and the management. In Britain, the Combination Act 1799 forbade workers to form any kind of trade union until its repeal in 1824. Even after this, unions were still severely restricted.

In 1832, the year of the Reform Act which extended the vote in Britain but did not grant universal suffrage, six men from Tolpuddle in Dorset founded the Friendly Society of Agricultural Laborers to protest against the gradual lowering of wages in the 1830s. They refused to work for less than 10 shillings a week, although by this time wages had been reduced to seven shillings a week and were due to be further reduced to six shillings. In 1834 James Frampton, a local landowner, wrote to the Prime Minister,

Lord Melbourne, to complain about the union, invoking an obscure law from 1797 prohibiting people from swearing oaths to each other, which the members of the Friendly Society had done. James Brine, James Hammett, George Loveless, George's brother James Loveless, George's brother in-law Thomas Standfield, and Thomas's son John Standfield were arrested, found guilty, and transported to Australia. They became known as the Tolpuddle martyrs. In the 1830s and 1840s the Chartist movement was the first large scale organized working class political movement which campaigned for political equality and social justice. Its *Charter* of reforms received over three million signatures but was rejected by Parliament without consideration.

Working people also formed friendly societies and co-operative societies as mutual support groups against times of economic hardship. Enlightened industrialists, such as Robert Owen also supported these organizations to improve the circumstances of the working class.

Unions slowly overcame the legal restrictions on the right to strike. In 1842, a General Strike involving cotton workers and colliers were organized through the Chartist movement which stopped production across Great Britain.

Eventually effective political organization of working people was achieved through the trades unions who, after the extensions of the franchise in 1867 and 1885, began to support socialist political parties that later merged to became the British Labor Party.

4.1.24 Other effects

The application of steam power to the industrial processes of printing supported a massive expansion of newspaper and popular book publishing, which reinforced rising literacy and demands for mass political participation.

During the Industrial Revolution, the life expectancy of children increased dramatically. The percentage of the children born in London who died before the age of five decreased from 74.5% in 1730–1749 to 31.8% in 1810–1829.

The growth of modern industry from the late 18th century onward led to massive urbanization and the rise of new great cities, first in Europe and then in other regions, as new opportunities brought huge numbers of migrants from rural communities into urban regions. In 1800, only 3% of the world's population lived in cities, a figure that has risen to nearly 50% at the beginning of the 21st century. In 1717 Manchester was merely a market town of 10,000 people, but by 1911 it had a population of 2.3 million.

The greatest killer in the cities was tuberculosis (TB). By the late 1800s, between 7 and 9 in 10 town dwellers in Europe and North America were infected with tuberculosis, and about 8 in 10 of those who developed active tuberculosis died of it. Forty percent of deaths among the urban working class were from tuberculosis.

4.1.25 Industrialisation beyond Great Britain

4.1.25.1 Continental Europe

The Industrial Revolution on Continental Europe came a little later than in Great Britain. In many industries, this involved the application of technology developed in Britain in new places. Often the technology was purchased from Britain or British engineers and entrepreneurs moved abroad in search of

new opportunities. By 1809 part of the Ruhr Valley in Westphalia was called 'Miniature England' because of its similarities to the industrial regions of England. The German, Russian and Belgian governments all provided state funding to the new industries. In some cases (such as iron), the different availability of resources locally meant that only some aspects of the British technology were adopted.

4.1.25.2 Belgium

Belgium was the second country, after Britain, in which the industrial revolution took place and the first in continental Europe:

Wallonia (French speaking southern Belgium) was the first region to follow the British model successfully. Starting in the middle of the 1820s, and especially after Belgium became an independent nation in 1830, numerous works comprising coke blast furnaces as well as puddling and rolling mills were built in the coal mining regions around Liège and Charleroi. The leader was a transplanted Englishman John Cockerill. His factories at Seraing integrated all stages of production, from engineering to the supply of raw materials, as early as 1825.

Wallonia exemplified the radical evolution of industrial expansion. Thanks to coal (the French word "houille" was coined in Wallonia), the region geared up to become the 2nd industrial power in the world after Britain. But it is also pointed out by many researchers, with its *Sillon industrial*, 'Especially in the Haine, Sambre and Meuse valleys, between the Borinage and Liège, (...) there was a huge industrial development based on coal-mining and iron-making...'. Philippe Raxhon wrote about the period after 1830: "It was not propaganda but a reality the Walloon regions were becoming the second industrial power all over the world after Britain." "The sole industrial center outside the collieries and blast furnaces of Walloon was the old cloth making town of Ghent." Michel De Coster, Professor at the Université de Liège wrote also: "The historians and the economists say that Belgium was the second industrial power of the world, in proportion to its population and its territory (...) But this rank is the one of Wallonia where the coal-mines, the blast furnaces, the iron and zinc factories, the wool industry, the glass industry, the weapons industry... were concentrated"

4.1.25.2.1 Demographic effects

Wallonia was also the birthplace of a strong Socialist party and strong trade-unions in a particular sociological landscape. On the left, the *Sillon industries*, which runs from Mons in the west, to Verviers in the east (except part of North Flanders, in another period of the industrial revolution, after 1920). Even if Belgium is the second industrial country after Britain, the effect of the industrial revolution there was very different. In 'Breaking stereotypes', Muriel Neven and Isabelle Devious says:

The industrial revolution changed a mainly rural society into an urban one, but with a strong contrast between northern and southern Belgium. During the Middle Ages and the Early Modern Period, Flanders was characterized by the presence of large urban centers (...) at the beginning of the nineteenth century this region (Flanders), with an urbanization degree of more than 30 per cent, remained one of the most urbanized in the world. By comparison, this proportion reached only 17 per cent in Wallonia, barely 10 per cent in most West European countries, 16 per cent in France and 25 per cent in Britain. Nineteenth century industrialization did not affect the traditional urban infrastructure, except in Ghent (...) Also, in Wallonia the traditional urban network was largely unaffected by the industrialization process, even though the proportion of town -dwellers rose from 17 to 45 per cent between 1831 and 1910. Especially in the Haine, Sambre and Meuse valleys, between the Borinage and Liège, where there was a huge industrial development based on coal-mining and iron-making, urbanization was fast. During these eighty years the number of municipalities with more than 5,000 inhabitants increased from only 21 to more than

one hundred, concentrating nearly half of the Walloon population in this region. Nevertheless, industrialization remained quite traditional in the sense that it did not lead to the growth of modern and large urban centers, but to a conurbation of industrial villages and towns developed around a coal-mine or a factory. Communication routes between these small centres only became populated later and created a much less dense urban morphology than, for instance, the region around Liège where the old town was there to direct migratory flows.

4.1.25.3 France

The industrial revolution in France followed a particular course as it did not correspond to the main model followed by other countries. Notably, most French historians argue France did not go through a clear *take-off*. Instead, France's economic growth and industrialization process were slow and steady through the 18th and 19th centuries. However, some stages were identified by Maurice Lévy-Leboyer:

- French Revolution and Napoleonic wars (1789–1815),
- Industrialization, along with Britain (1815–1860),
- Economic slowdown (1860–1905),
- Renewal of the growth after 1905.

4.1.25.4 Germany

Based on its leadership in chemical research in the universities and industrial laboratories, Germany became dominant in the world's chemical industry in the late 19th century. At first the production of dyes based on aniline was critical.

Germany's political disunity—with three dozen states—and a pervasive conservatism made it difficult to build railways in the 1830s. However, by the 1840s, trunk lines linked the major cities; each German state was responsible for the lines within its own borders. Lacking a technological base at first, the Germans imported their engineering and hardware from Britain, but quickly learned the skills needed to operate and expand the railways. In many cities, the new railway shops were the centres of technological awareness and training, so that by 1850, Germany was self-sufficient in meeting the demands of railroad construction, and the railways were a major impetus for the growth of the new steel industry. Observers found that even as late as 1890, their engineering was inferior to Britain's. However, German unification in 1870 stimulated consolidation, nationalization into state-owned companies, and further rapid growth. Unlike the situation in France, the goal was support of industrialization, and so heavy lines crisscrossed the Ruhr and other industrial districts, and provided good connections to the major ports of Hamburg and Bremen. By 1880, Germany had 9,400 locomotives pulling 43,000 passengers and 30,000 tons of freight, and pulled ahead of France

4.1.25.5 Sweden

During the period 1790–1815 Sweden experienced two parallel economic movements: an **agricultural revolution** with larger agricultural estates, new crops and farming tools and a commercialization of farming, and a **protoindustrialisation**, with small industries being established in the countryside and with workers switching between agricultural work in the summer season and industrial production in the winter season. This led to economic growth benefiting large sections of the population and leading up to a **consumption revolution** starting in the 1820s.

In the period 1815–1850 the protoindustries developed into more specialized and larger industries. This period witness increasing regional specialization with mining in Bergslagen, textile mills in Sjuhäradsbygden and forestry in Norrland. Several important institutional changes took place in this period, such as free and mandatory schooling introduced 1842 (as the first country in the world), the abolishment of a previous national monopoly on trade in handicrafts in 1846, and a stock company law in 1848.

During the period 1850–1890 Sweden witnessed a veritable explosion in its export sector, with agricultural crops, wood and steel being the three dominating categories. Sweden abolished most tariffs and other barriers to free trade in the 1850s and joined the gold standard in 1873.

During the period 1890–1930 the second industrial revolution took place in Sweden. During this period new industry developed with their focus on the domestic market: mechanical engineering, power utilities, papermaking and textile industries.

United States

The United States originally used horse-powered machinery to power its earliest factories, but eventually switched to water power, with the consequence that industrialisation was essentially limited to New England and the rest of the Northeastern United States, where fast-moving rivers were located. Horse-drawn production proved to be economically challenging and a more difficult alternative to the newer water-powered production lines. However, the raw materials (cotton) came from the Southern United States. It was not until after the Civil War in the 1860s that steam-powered manufacturing overtook water-powered manufacturing, allowing the industry to fully spread across the nation.

Thomas Somers and the Cabot Brothers founded the Beverly Cotton Manufactory in 1787, the first cotton mill in America, the largest cotton mill of its era, and a significant milestone in the research and development of cotton mills in the future. This cotton mill was designed to utilize horse-powered production, however the operators quickly learned that the economic stability of their horse-drawn platform was unstable, and had fiscal issues for years after it was built. Despite the losses, the Manufactory served as a playground of innovation, both in turning a large amount of cotton, but also developing the water-powered milling structure used in Slater's Mill.

Samuel Slater (1768–1835) is the founder of the Slater Mill. As a boy apprentice in Derbyshire, England, he learned of the new techniques in the textile industry and defied laws against the movement of skilled workers by leaving for New York in 1789, hoping to make money with his knowledge. Slater founded Slater's Mill at Pawtucket, Rhode Island, in 1793. He went on to own thirteen textile mills. Daniel Day established a wool carding mill in the Blackstone Valley at Uxbridge, Massachusetts in 1809, the third woollen mill established in the U.S. (The first was in Hartford, Connecticut, and the second at Watertown, Massachusetts.) The John H. Chafee Blackstone River Valley National Heritage Corridor retraces the history of "America's Hardest-Working River', the Blackstone. The Blackstone River and its tributaries, which cover more than 45 miles (72 km) from Worcester to Providence, was the birthplace of America's Industrial Revolution. At its peak over 1100 mills operated in this valley, including Slater's mill, and with it the earliest beginnings of America's Industrial and Technological Development.

While on a trip to England in 1810, Newburyport merchant Francis Cabot Lowell was allowed to tour the British textile factories, but not take notes. Realizing the War of 1812 had ruined his import business but that a market for domestic finished cloth was emerging in America, he memorized the design of textile machines, and on his return to the United States, he set up the Boston Manufacturing Company. Lowell and his partners built America's second cotton-to-cloth textile mill at Waltham, Massachusetts, second to

the Beverly Cotton Manufactory After his death in 1817, his associates built America's first planned factory town, which they named after him. This enterprise was capitalized in a public stock offering, one of the first uses of it in the United States. Lowell, Massachusetts, utilizing 5.6 miles (9.0 km) of canals and ten thousand horsepower delivered by the Merrimack River, is considered by some to be a major contributor to the success of the American Industrial Revolution. The short-lived utopia-like Lowell System was formed, as a direct response to the poor working circumstances in Britain. However, by 1850, especially following the Irish Potato Famine, the system had been replaced by poor immigrant labor.

The industrialization of the watch industry started 1854 also in Waltham, Massachusetts, at the Waltham Watch Company, with the development of machine tools, tools, gauges and assembling methods adapted to the micro precision required for watches.

4.1.25.6 Japan

The industrial revolution began about 1870 as Meiji period leaders decided to catch up with the West. The government built railroads, improved roads, and inaugurated a land reform program to prepare the country for further development. It inaugurated a new Western-based education system for all young people, sent thousands of students to the United States and Europe, and hired more than 3,000 Westerners to teach modern science, mathematics, technology, and foreign languages in Japan (O-yatoi gaikokujin).

In 1871 a group of Japanese politicians known as the Iwakura Mission toured Europe and the USA to learn western ways. The result was a deliberate state led industrialization policy to enable Japan to quickly catch up. The Bank of Japan, founded in 1877, used taxes to fund model steel and textile factories. Education was expanded and Japanese students were sent to study in the west.

Modern industry first appeared in textiles, including cotton and especially silk, which was based in home workshops in rural regions.

4.1.26 Second Industrial Revolution

Steel is often cited as the first of several new regions for industrial mass-production, which are said to characterize a "Second Industrial Revolution", beginning around 1850, although a method for mass manufacture of steel was not invented until the 1860s, when Sir Henry Bessemer invented a new furnace which could convert wrought iron into steel in large quantities. However, it only became widely available in the 1870s after the process was modified to produce more uniform quality. Bessemer steel was being displaced by the open hearth furnace near the end of the 19th century.

This second Industrial Revolution gradually grew to include the chemical industries, petroleum refining and distribution, electrical industries, and, in the 20th century, the automotive industries, and was marked by a transition of technological leadership from Britain to the United States and Germany.

The introduction of hydroelectric power generation in the Alps enabled the rapid industrialisation of coaldeprived northern Italy, beginning in the 1890s. The increasing availability of economical petroleum products also reduced the importance of coal and further widened the potential for industrialization.

By the 1890s, industrialization in these regions had created the first giant industrial corporations with burgeoning global interests, as companies like U.S. Steel, General Electric, Standard Oil and Bayer AG joined the railroad companies on the world's stock markets.

4.1.27 Intellectual paradigms and criticism

4.1.27.1 Capitalism

The advent of the Age of Enlightenment provided an intellectual framework which welcomed the practical application of the growing body of scientific knowledge—a factor evidenced in the systematic development of the steam engine, guided by scientific scrutiny, and the development of the political and sociological analyses, culminating in Adam Smith's *The Wealth of Nations*. One of the main arguments for capitalism, presented for example in the book *The Improving State of the World*, is that industrialisation increases wealth for all, as evidenced by raising life expectancy, reduced working hours, and no work for children and the elderly.

4.1.27.2 Socialism

Socialism emerged as a critique of capitalism. Marxism began essentially as a reaction to the Industrial Revolution. According to Karl Marx, industrialization polarized society into the bourgeoisie (those who own the means of production, the factories and the land) and the much larger proletariat (the working class who actually perform the labor necessary to extract something valuable from the means of production). He saw the industrialization process as the logical dialectical progression of feudal economic modes, necessary for the full development of capitalism, which he saw as in itself a necessary precursor to the development of socialism and eventually communism.

4.1.27.3 Romanticism

During the Industrial Revolution an intellectual and artistic hostility towards the new industrialisation developed. This was known as the Romantic movement. Its major exponents in English included the artist and poet William Blake and poets William Wordsworth, Samuel Taylor Coleridge, John Keats, Lord Byron and Percy Bysshe Shelley. The movement stressed the importance of "nature" in art and language, in contrast to "monstrous" machines and factories; the "Dark satanic mills" of Blake's poem "And did those feet in ancient time". Mary Shelley's novel *Frankenstein* reflected concerns that scientific progress might be two-edged.

4.1.28 Causes

The causes of the Industrial Revolution were complicated and remain a topic for debate, with some historians believing the Revolution was an outgrowth of social and institutional changes brought by the end of feudalism in Britain after the English Civil War in the 17th century. As national border controls became more effective, the spread of disease was lessened, thereby preventing the epidemics common in previous times. The percentage of children who lived past infancy rose significantly, leading to a larger workforce. The Enclosure movement and the British Agricultural Revolution made food production more efficient and less labor-intensive, forcing the surplus population who could no longer find employment in farming into a cottage industry, for example weaving, and in the longer term into the cities and the newly developed factories. The colonial expansion of the 17th century with the accompanying development of international trade, creation of financial markets and accumulation of capital are also cited as factors, as is the scientific revolution of the 17th century.

Until the 1980s, it was universally believed by academic historians that technological innovation was the heart of the Industrial Revolution and the key enabling technology was the invention and improvement of

the steam engine. However, recent research into the Marketing Era has challenged the traditional, supplyoriented interpretation of the Industrial Revolution.

Lewis Mumford has proposed that the Industrial Revolution had its origins in the Early Middle Ages, much earlier than most estimates. He explains that the model for standardized mass production was the printing press and that "the archetypal model for the industrial era was the clock". He also cites the monastic emphasis on order and timekeeping, as well as the fact that medieval cities had at their center a church with bell ringing at regular intervals as being necessary precursors to a greater synchronization necessary for later, more physical, manifestations such as the steam engine.

The presence of a large domestic market should also be considered an important driver of the Industrial Revolution, particularly explaining why it occurred in Britain. In other nations, such as France, markets were split up by local regions, which often imposed tolls and tariffs on goods traded among them. Internal tariffs were abolished by Henry VIII of England, they survived in Russia till 1753, 1789 in France and 1839 in Spain.

Governments' grant of limited monopolies to inventors under a developing patent system (the Statute of Monopolies in 1623) is considered an influential factor. The effects of patents, both good and ill, on the development of industrialisation are clearly illustrated in the history of the steam engine, the key enabling technology. In return for publicly revealing the workings of an invention the patent system rewarded inventors such as James Watt by allowing them to monopolize the production of the first steam engines, thereby rewarding inventors and increasing the pace of technological development. However, monopolies bring with them their own inefficiencies which may counterbalance, or even overbalance, the beneficial effects of publicizing ingenuity and rewarding inventors. Watt's monopoly may have prevented other inventors, such as Richard Trevithick, William Murdoch or Jonathan Hornblower, from introducing improved steam engines, thereby retarding the industrial revolution by about 16 years.

4.1.28.1 Causes in Europe

One question of active interest to historians is why the industrial revolution occurred in Europe and not in other parts of the world in the 18th century, particularly China, India, and the Middle East, or at other times like in Classical Antiquity or the Middle Ages. Numerous factors have been suggested, including education, technological changes, "modern" government, "modern" work attitudes, ecology, and culture. The Age of Enlightenment not only meant a larger educated population but also more modern views on work. However, most historians contest the assertion that Europe and China were roughly equal because modern estimates of per capita income on Western Europe in the late 18th century are of roughly 1,500 dollars in purchasing power parity (and Britain had a per capita income of nearly 2,000 dollars) whereas China, by comparison, had only 450 dollars.

Some historians such as David Landes and Max Weber credit the different belief systems in China and Europe with dictating where the revolution occurred. The religion and beliefs of Europe were largely products of Judaeo-Christianity, and Greek thought. Conversely, Chinese society was founded on men like Confucius, Mencius, Han Feizi (Legalism), Lao Tzu (Taoism), and Buddha (Buddhism). Whereas the Europeans believed that the universe was governed by rational and eternal laws, the East believed that the universe was in constant flux and, for Buddhists and Taoists, not capable of being rationally understood. Other factors include the considerable distance of China's coal deposits, though large, from its cities as well as the then unnavigable Yellow River that connects these deposits to the sea.

Regarding India, the Marxist historian Rajani Palme Dutt said: "The capital to finance the Industrial Revolution in India instead went into financing the Industrial Revolution in Britain." In contrast to China,

India was split up into many competing kingdoms, with the three major ones being the Marathas, Sikhs and the Mughals. In addition, the economy was highly dependent on two sectors—farming of subsistence and cotton, and there appears to have been little technical innovation. It is believed that the vast amounts of wealth were largely stored away in palace treasuries by totalitarian monarchs prior to the British take over. Absolutist dynasties in China, India, and the Middle East failed to encourage manufacturing and exports, and expressed little interest in the well-being of their subjects.

4.1.28.2 Causes in Britain

Great Britain provided the legal and cultural foundations that enabled entrepreneurs to pioneer the industrial revolution. Key factors fostering this environment were: (1) The period of peace and stability which followed the unification of England and Scotland; (2) no trade barriers between England and Scotland; (3) the rule of law (respecting the sanctity of contracts); (4) a straightforward legal system which allowed the formation of joint-stock companies (corporations); and (5) a free market (capitalism).

Geographical and natural resource advantages of Great Britain were the fact that it had extensive coastlines and many navigable rivers in an age where water was the easiest means of transportation and having the highest quality coal in Europe.

There were two main values that really drove the industrial revolution in Britain. These values were selfinterest and an entrepreneurial spirit. Because of these interests, many industrial advances were made that resulted in a huge increase in personal wealth. These advancements also greatly benefitted the British society as a whole. Countries around the world started to recognize the changes and advancements in Britain and use them as an example to begin their own industrial revolutions.

The debate about the start of the Industrial Revolution also concerns the massive lead that Great Britain had over other countries. Some have stressed the importance of natural or financial resources that Britain received from its many overseas colonies or that profits from the British slave trade between Africa and the Caribbean helped fuel industrial investment. However, it has been pointed out that slave trade and West Indian plantations provided only 5% of the British national income during the years of the Industrial Revolution. Even though slavery accounted for minimal economic profits in Britain during the Industrial Revolution, Caribbean-based demand accounted for 12% of Britain's industrial output.

Instead, the greater liberalization of trade from a large merchant base may have allowed Britain to produce and use emerging scientific and technological developments more effectively than countries with stronger monarchies, particularly China and Russia. Britain emerged from the Napoleonic Wars as the only European nation not ravaged by financial plunder and economic collapse, and having the only merchant fleet of any useful size (European merchant fleets were destroyed during the war by the Royal Navy). Britain's extensive exporting cottage industries also ensured markets were already available for many early forms of manufactured goods. The conflict resulted in most British warfare being conducted overseas, reducing the devastating effects of territorial conquest that affected much of Europe. This was further aided by Britain's geographical position—an island separated from the rest of mainland Europe.

Another theory is that Britain was able to succeed in the Industrial Revolution due to the availability of key resources it possessed. It had a dense population for its small geographical size. The enclosure of common land and the related agricultural revolution made a supply of this labor readily available. There was also a local coincidence of natural resources in the North of England, the English Midlands, South Wales and the Scottish Lowlands. Local supplies of coal, iron, lead, copper, tin, limestone and water power, resulted in excellent circumstances for the development and expansion of industry. Also, the

damp, mild weather circumstances of the North West of England provided ideal circumstances for the spinning of cotton, providing a natural starting point for the birth of the textile industry.

The stable political situation in Britain from around 1688, and British society's greater receptiveness to change (compared with other European countries) can also be said to be factors favoring the Industrial Revolution. Peasant resistance to industrialization was largely eliminated by the Enclosure movement, and the landed upper classes developed commercial interests that made them pioneers in removing obstacles to the growth of capitalism. (This point is also made in Hilaire Belloc's The Servile State.)

Britain's population grew 280% 1550–1820, while the rest of Western Europe grew 50-80%. 70% of European urbanization happened in Britain 1750–1800. By 1800, only the Netherlands was more urbanized than Britain. This was only possible because coal, coke, imported cotton, brick and slate had replaced wood, charcoal, flax, peat and thatch. The latter compete with land grown to feed people while mined materials do not. Yet more land would be freed when chemical fertilizers replaced manure and horse's work was mechanized.

In 1700, 5/6 of coal mined worldwide was in Britain, while the Netherlands had none; so despite having Europe's best transport, most urbanized, well paid, literate people and lower taxes, it failed to industrialize. In the 18th century, it was the only European country whose cities and population shrank. Without coal, Britain would have run out of suitable river sites for mills by the 1830s.

4.1.29 Transfer of knowledge

Knowledge of innovation was spread by several means. Workers who were trained in the technique might move to another employer or might be poached. A common method was for someone to make a study tour, gathering information where he could. During the whole of the Industrial Revolution and for the century before, all European countries and America engaged in study-touring; some nations, like Sweden and France, even trained civil servants or technicians to undertake it as a matter of state policy. In other countries, notably Britain and America, this practice was carried out by individual manufacturers eager to improve their own methods. Study tours were common then, as now, as was the keeping of travel diaries. Records made by industrialists and technicians of the period are an incomparable source of information about their methods.

Another means for the spread of innovation was by the network of informal philosophical societies, like the Lunar Society of Birmingham, in which members met to discuss 'natural philosophy' (*i.e.* science) and often its application to manufacturing. The Lunar Society flourished from 1765 to 1809, and it has been said of them, "They were, if you like, the revolutionary committee of that most far reaching of all the eighteenth century revolutions, the Industrial Revolution". Other such societies published volumes of proceedings and transactions. For example, the London-based Royal Society of Arts published an illustrated volume of new inventions, as well as papers about them in its annual *Transactions*.

There were publications describing technology. Encyclopedias such as Harris's *Lexicon Technicum* (1704) and Abraham Rees's *Cyclopaedia* (1802–1819) contain much of value. *Cyclopaedia* contains an enormous amount of information about the science and technology of the first half of the Industrial Revolution, very well illustrated by fine engravings. Foreign printed sources such as the *Descriptions des Arts et Métiers* and Diderot's *Encyclopédie* explained foreign methods with fine engraved plates.

Periodical publications about manufacturing and technology began to appear in the last decade of the 18th century, and many regularly included notice of the latest patents. Foreign periodicals, such as the Annales

des Mines, published accounts of travels made by French engineers who observed British methods on study tours.

4.1.30 Protestant work ethic

Another theory is that the British advance was due to the presence of an entrepreneurial class which believed in progress, technology and hard work. The existence of this class is often linked to the Protestant work ethic and the particular status of the Baptists and the dissenting Protestant sects, such as the Quakers and Presbyterians that had flourished with the English Civil War. Reinforcement of confidence in the rule of law, which followed establishment of the prototype of constitutional monarchy in Britain in the Glorious Revolution of 1688, and the emergence of a stable financial market there based on the management of the national debt by the Bank of England, contributed to the capacity for, and interest in, private financial investment in industrial ventures.

Dissenters found themselves barred or discouraged from almost all public offices, as well as education at England's only two universities at the time (although dissenters were still free to study at Scotland's four universities). When the restoration of the monarchy took place and membership in the official Anglican Church became mandatory due to the Test Act, they thereupon became active in banking, manufacturing and education. The Unitarians, in particular, were very involved in education, by running Dissenting Academies, where, in contrast to the universities of Oxford and Cambridge and schools such as Eton and Harrow, much attention was given to mathematics and the sciences—regions of scholarship vital to the development of manufacturing technologies.

Historians sometimes consider this social factor to be extremely important, along with the nature of the national economies involved. While members of these sects were excluded from certain circles of the government, they were considered fellow Protestants, to a limited extent, by many in the middle class, such as traditional financiers or other businessmen. Given this relative tolerance and the supply of capital, the natural outlet for the more enterprising members of these sects would be to seek new opportunities in the technologies created in the wake of the scientific revolution of the 17th century.

4.2 Contemporary Patterns and Impacts of Industrialization and Development

4.2.1 The character of industrialization

Industrialization is frequently considered as the replacement of farming and resource extraction by manufacturing and service activity. This transition takes different forms in different places at different times. Geographies of industrialization and economic development are important in understanding future growth patterns.

The activities of a regional or national economy are commonly divided into five components. The primary sector includes activities directly involving the physical environment; occupations such as farming, fishing, forestry, hunting, and mining. The secondary sector involves the processing of raw materials and manufacturing. Most workers in North America are in the tertiary sector where they provide services. The service sector includes wholesale and retail sales, transportation, and finance, insurance, real estate (FIRE activities). Those whose work involves the exchange or application of information, knowledge, and/or capital are thought to be in the four or quaternary sector. Finally the expansion of the knowledge economy has necessitated the term quinary sector to refer to higher order, complexity, and specialist tasks of control, production and management.

As a country goes through industrialization or economic development it is possible to see a marked shift in the percentage of the labor force involved in the each of the five sectors. Nonindustrial states have most of their workers involved in the primary sector. When industrialization begins there is great growth in the secondary sector and the percent of workers involved in primary production decreases. With continued growth in economic activity the labor force shifts toward the third, fourth, and fifth sectors.

4.2.1.1 Specialization of places

As economies develop places become specialized in certain forms of production whether it is in the primary, secondary, or other sectors of the economy. Underlying this specialization is the idea of comparative advantage. This is the competitive edge (in the form of lower production costs, cheaper raw materials, etc.) enjoyed by one location over another. Assuming an established demand for a commodity like bananas, places with favorable growing circumstances and inexpensive labor will become specialized in the production of the fruit. By the same logic Silicon Valley can specialize in technology innovation partly because its pool of highly skilled labor, creative entrepreneurs, and supply of investment capital gives it a comparative advantage over a region with similar human resources. As a result of such comparative advantages some locations begin to specialize in one economic activity and exchange goods with other regions.

4.2.1.2 Transport and communications

However, without the ability to move goods between locations, specialization and economic growth cannot proceed. Complementary refers to the needs of one region matching the products of another region (for example, oranges shipped from rural Florida to northern cities); intervening opportunity refers to the presence of a nearer opportunity which reduces the attractiveness of a more distant location; and transferability, which refers to ease with which products can be moved.

However, the nature of technological and management characteristics of transport and communications systems themselves have a great impact on economic development. Transportation and communication require a specially designed and constructed landscape (roads, canals, railroad tracks, airports, TV stations, telephone lines and the like). Even the Internet requires a series of physical connections. Because these fixed investments are expensive and risky, they are often constructed first in places with existing locational resources. Contemporary investment in internet facilities illustrate the connected idea of cumulative causation, with most growth occurring in countries that have high levels of per capita income.

Once constructed transport and communications systems may constrain future economic growth. For example colonial lines of communication helped the flow of materials out of many colonies but do little to enable internal flows between remote parts of these now independent nations.

Transportation and communication systems can be viewed as being like a surface or a network. On a surface movement can occur in any direction like balls on a pool table. But because all the balls move with the same freedom of direction collisions can be frequent. In the real world movement on surface characterized by the freedom to move in any direction but at limited speeds. On the other had a network restricts movement to certain paths but because the likelihood of collisions is lowered the movement can occur at higher speeds. Because humans like both speeds without directional constraints we continually modify our systems to make the faster and to provide us more choices.

4.2.1.3 Models of industrial location

The scrutiny of circulation systems is focused on the ways technology enables people to reduce the effect of friction of distance. Industrial location theory is the study of how the costs of overcoming distance (transportation costs) affect the location of economic activity. For example, Hotelling's seemingly trivial consideration of where two competing ice cream vendors should stand on a beach sets the stage for an appreciation of locational interdependence. He selected a beach because we can all understand that it as a very simple place, that is it is simplified version of the real world. He further assumed that people would be equally spaced on the beach. Therefore an ice cream vendor seeking to serve as many people as

possible would set up an establishment in the middle of the beach. A second vendor would by the same logic locate right next to the first so they could divide the market in half. However the third vendor makes the geography significantly more complicated, and the vendors must move. Thus the location of one vendor is dependent on the location of the others.

Alfred Weber's industrial location theory also attempts to use transposition costs to determine where industrial activity is likely to occur. His model called for a featureless plain that contain a source of raw material and a marketplace for the products of the manufacturing process. His model accounts for the several different aspects of the change of raw material during the manufacturing process. If weight loss occurred the best place for the factory would be the site of raw materials, so that the costs of transporting the un-need portion of the raw material could be avoided. Processes that increased the bulk of the product, or made it either more perishable or fragile would be better sited close to the market. The work of other location theorists, notably Walter Christaller and August Loesch, illustrates how distance affects the marketing strategies of enterprises

Agglomeration, that is the concentration of enterprises in a locale, occurs when certain circumstances are met. First when a cluster of activities creates enough demand for support services in a particular place (for example, temporary workers, restaurants, legal advisors, or specialist engineers). Second, activities needing access to information and control tend to concentrate because the entrepreneurs believe that face to face communication is better than indirect ways no matter how rapid other forms of communication might be. Third when an infrastructure of cultural institutes such as school, hospitals, and services reach a certain level of new and divergent investment is attracted to the region.

By contrast, de-agglomeration (de-concentration due to technological change or increased costs of continued clustering) occurs when too many activities, perhaps of the wrong type, are too close together. Traffic congestion, pollution, labor shortages, capital shortages, supply shortages caused by local demand, increased land prices, and a general decay of infrastructure because of the intense use of the infrastructure made by all the establishments can cause some enterprises to move out of the traditional centres.

By this point in the class, students can use factors of absolute location, relative location, distance, accessibility, linkages, and interdependencies describe and predict the location of economic activity at the scale of individual companies or establishments.

4.2.2 Spatial aspects of the rise of industrial economies

The second section applies the generalizations and theories discussed in the first part to describe the development of industrial economies during the modern era. It also attempts to answer questions about the causes behind the uneven distribution of wealth and industrialization we see in today's world. It will also attempt to determine if the geographic factors are becoming less or more important in a shrinking world. Students should become aware of the interdependence between economic development and the matters raised in other sections of the course.

4.2.2.1 Changing Energy Sources and Technology

Energy sources and technology in combination greatly impact the timing and place of industrialization. The growth of mechanized production, which is usually thought of the beginning of the industrial revolution, is strongly linked to the textile industry in Lancashire, in Northwest England. Mechanical looms could only be established in places with a sufficient energy supply that were close to sources of the early venture capital. Similarly, the industrial revolution in North America also first took place in rural regions with adequate energy supplies (waterfalls), technology, raw materials, capital, and access to domestic markets.

Technology and energy are essential to industrialization. Geography focuses on the place or spatial context of this relationship. It is interesting to show students how the relationship between industrialization and urban location changes. The first industrial establishments were rural, the mass production factories of the early 1900s were urban based, and the expansion of tertiary and some quaternary activities is closely associated with the growth of suburban regions (e.g. shopping malls, edge cities).

4.2.2.2 Economic Cores and Peripheries

In geography the term core refers to regions with concentrations of employment, capital, and economic control. Cores develop when industries take advantage of agglomeration economies to reduce costs. Industries attract new investment in the core through backward linkages (supplying firms with components and services), forward linkages (helping firms find uses and destinations for their products), and ancillary industries (firms providing services for other corporations are attracted to a core when a critical threshold of economic activity is reached). These attractions produce an upward spiral of economic growth, which is in part due to the impact of in-migrants and, immigrants. These young, ambitious, and eager to work creating new markets for consumer goods. Furthermore, profits were reinvested into infrastructure developments which further improved the competitive advantage of the core relative to other regions (e.g. improved accessibility would cut production costs). Profits were also used to develop new forms of technology that could launch new waves of industrial expansion.

However, the growth of industrial cores cannot be understood without examining the links between the core and peripheral places. In general a core will dominate a set of peripheral places because it receives more from the peripheral places than it returns. As a regional economic core develops, raw materials, skilled migrants, and the savings would flow from the periphery to the core. Only at later stages of development, and perhaps with government intervention through grants, loans, road building, special enterprise zones and the like, does the core have a positive impact upon economic activities in the surrounding periphery.

The scholars called structuralists believe that the growth of the core is only possible through the systematic underdevelopment of the periphery. Wallerstein's world systems model is based on coreperiphery relations at the global scale. A study of the emergence of specific industrial cores, for example the North American Manufacturing Belt (NAMB) will show students how the diffusion of ideas, innovations, and knowledge affect the course of industrialization. A scrutiny of the emergence of the Japanese industrial core in the 1920s-1950s could show how position in the emerging global economy affects the rise of new cores.

4.2.2.3 Models of Economic Development

It's useful to draw connections between the political geography section of the course and this material. Colonialism was instrumental in creating the international division of labor. Colonies with particular comparative advantages specialized in the production of raw materials and foods, provided they did not compete with the interests of the core nations.

Turn of the century imperialism on the part of Europe, the United States, and later Japan helped bind the global periphery into the emerging world system. Earlier economic specializations and terms of trade, new rounds of infrastructure investment, brain drain, and capital depletion increased the dependency of most of the world's population of a few core nations. With the USSR and China traveling down a Second World state-planned economic road following the Second World War, it was the North American economy, with Europe is trailing and Japan catches up, which dominated economic growth in the expansionary 1960s. This First World dominated an increasingly politically independent Third World.

West German Chancellor Brandt drew his famous North-South line on the map of economic development in the late 1960s.

The-classical economic model developed by Roster's Stages of Economic Development model argues that an isolated economy goes through a series of stages of economic processes, including income in elasticities of demand (the idea that the demand for, say, Brussell sprouts does not increase as you get richer). Sociologist Immanuel Wallerstein's contributions to an understanding of the emergence of a World System, dominated by a core-semi periphery-periphery structure, is more obviously spatial in orientation, and includes a dynamic element that describes how economies may wax and wane with the passage of technology and political systems.

4.2.3 Contemporary global patterns of industrialization

The term globalization is used to describe elements of the highly integrated global economy. This section focuses mostly on the transnational (spanning two or more nations), national, and regional variations in economic activity of the past thirty years or so.

The twin ideas of linkage and interdependence help bring globalization into focus. Technological innovation in space shrinking (jet engines) and time saving (email, fax, robotics) processes have enabled industrial organizations to stay efficiently co-ordinated while they grow in size and scope of operation. Transnational companies (TNCs or Multinational Companies, MNCs), like Ford and Exxon, now produce more than many countries do: for example, General Motors recently reported \$130 billion in sales, almost double Pakistan's GNP! The ability of producers to move production sites around, and re-negotiate contracts with suppliers, wholesalers, retailers, labor, and even governments, is described under the umbrella heading of flexible accumulation, to distinguish it from the more rigid production relationships that previously characterized Fordism.

Linkages have also facilitated travel, tourism, and the diffusion of western, particularly American, consumer culture around the globe. Tourism has grown into a major global industry and helped fuel the demand for images and news of far flung places. Contemporary industrial processes in any economic sector exhibit an increase in interdependency. The so-called New International Division of Labor describes how periphery regions are now dependent upon the core for creating manufacturing jobs, while core TNCs are likewise dependent upon the periphery for the opportunity to obtain cheap wages, production regimes unfettered by complex costly environmental regulations, and access to expanding markets.

Maps which use the nation-state lines miss what is distinctive about globalization but it operates through networks of flows between particular control points (world cities, places with a disproportionate share of economic, political, and cultural influence). Major industrial regions of the world are now woven into this web control.

Students should thus be encouraged to glimpse the contours of these new industrial geographies and their impacts at multiple geographic scales and using multiple markers. Likewise, the specific geography of production and consumption can also be appreciated at multiple scales. Firm level analyses demonstrate interdependency. The Newly Industrializing Countries (NICs), part of the semi-periphery of World Systems theory, provide an excellent recent example of some winners. Of these, the four Asian Tigers, South Korea, Taiwan, Hong Kong, and Singapore are often cited as examples of modern economic development. South Korea, Taiwan, and Singapore all appeared in the list of the US's top ten total trading partners in mid 1998. These places successfully attracted the high labor intensive production activities (e.g. shoe production and textiles) away from locations in the United States and Europe where labor costs were much greater.
4.2.3.1 Deindustrialization

The topic of deindustrialization encourages students to apply their understanding of place to economic change. For example, industrial activity is unevenly located through space because of the ways that innovation diffuses and the high fixed costs that stick or embed certain activities, technologies, and industries to place. Those regions with high labor costs and old technology experience deindustrialization as new technologies can be more cheaply appropriated elsewhere. For example, the higher amenity values, lower rates of unionization, government contracts, and availability of greenfield sites all helped spark the economic development of the US Sunbelt around key technologies (aerospace, defense, refining etc.). This drew investment away from the locations with high fixed costs.

However, other parts of the old NAMB, for example Columbus OH, had a sufficiently diverse industrial heritage and escaped from having all their industrial eggs in one basket. They were able to attract investment based on traditional locational advantages (e.g. accessibility). Retailing and services grew strongly. Still other parts of the NAMB reindustrialized on the back of Japanese investment in new auto plants. Some of this growth can be linked to the forward-looking and aggressive government actions in promoting the region, and the remaining pools of skilled labor and knowledge.

4.2.3.2 Economic development initiatives: government policies

Examples of government or state actions designed to create a productive environment for economic accumulation, also called regulation, are common. Internationally, the trade agreements negotiated by members of the General Agreement on Trade and Tariffs (GATT) help define global trade regulations. Governments provide development assistance bilaterally or through international agencies like the International Monetary Fund (IMF) and the World Bank and regional agencies like the Asian Development Bank and the Inter American Development Bank.

Governments have devised export processing zones, maquiladoras, empowerment zones, and tax free zones to attract and retain economic investment. Other strategies include the reduction of trade tariffs to promote the free movement of goods, capital, and in some cases labor across national borders (compare the EU and NAFTA), and the facilitation of access to national markets for firms who produce locally. Governments may also find it economically, politically, and morally undesirable to accept large regional disparities in economic growth. The creation of growth poles, regional development agencies, and even forward thrust capitals, together with the decentralization of public sector activities, have all been used to address these spatial inequalities in a domestic setting. Governments can do a great deal to influence the direction of local economic development by building infrastructure or making grants.

4.2.4 Impacts of industrialization

4.2.4.1Time-Space Compression

The term time-space compression is applied to the new relationships among time, space, and the material world. It derives from geographers earlier observation that, as technology enables travel times to be speeded up, places appear to get closer together Is this the end or a new beginning for geography? Now we see that characteristic of place no matter how subtle can be monitored and exploited. And because the of the time space convergence many more places with special features are available to us.

4.2.4.2 Social Stratification

Social impacts of industrialization can be illustrated by how the New International Division of Labor has tended to create particular clusters of jobs in particular places. For example, in world cities, a polarized (or dual) labor market structure seems to be emerging. Well-educated professionals take advantage of lucrative employment positions in FIRE, and have well paying career posts that include health insurance. Members of the secondary labor market over represent immigrants, minorities, and women, are employed

on a fixed contract, part-time, or even under-the-table basis, lack representation and benefits, and are minimally remunerated.

4.2.4.3 Health and Quality of Life

Industrialization changes human health and thus affects the quality of life, morbidity, mortality, and broader population dynamics. Many industrial processes have the effect of concentrating harmful materials near human settlements.

Review Questions

- 1. Define the Industrialisation?
- 2. Explain the development of industrialization?
- 3. Explain the Impacts of Industrialization?

Discussion Questions

Discuss the social impact of industrialization?

Ch-5 Cities and Urban Land Use

Learning Objectives

- To define the Cities.
- To explain the Development of Cities.
- To explain the Models of Urban Systems.
- To describe the Built Environment and Social Space.

5.1 Development and Character of Cities

A **city** is a relatively large and permanent settlement. many cities have a particular administrative, legal, or historical status based on local law.

For example, in the American state of Massachusetts an article of incorporation approved by the local state legislature distinguishes a town government from a town. In the United Kingdom and parts of the Commonwealth of Nations, a town is usually a settlement with a royal charter. The belief in this distinction is also common in England, where the presence of a cathedral is thought by many to distinguish a 'town ' (sometimes called a 'cathedral town ') from a 'town' (which has a parish church); the belief is incorrect (Chelmsford, for example, became a town only in 2012, but had a cathedral for most of the 20 century).

Cities generally have complex systems for sanitation, utilities, land usage, housing, and transportation. The concentration of development greatly facilitates interaction between people and businesses, benefiting both parties in the process. A big town or metropolis usually has associated suburbs and exurbs. Such cities are usually associated with metropolitan regions and urban regions, creating numerous business commuters traveling to urban centers for employment. Once a town expands far enough to reach another town , this region can be deemed a conurbation or megalopolis.

5.1.1 Origins

There is insufficient evidence to assert what circumstances gave rise to the first cities. Some theorists, however, have speculated on what they consider suitable pre-circumstances, and basic mechanisms that might have been important driving forces.

The conventional view holds that cities first formed after the Neolithic revolution. The Neolithic revolution brought farming, which made denser human populations possible, thereby supporting town development. The advent of farming encouraged hunter-gatherers to abandon nomadic lifestyles and to settle near others who lived by agricultural production. The increased population-density encouraged by farming and the increased output of food per unit of land created circumstances that seem more suitable for town -like activities. In his book, *Cities and Economic Development*, Paul Bairoch takes up this position in his argument that agricultural activity appears necessary before true cities can form.

According to Vere Gordon Childe, for a settlement to qualify as a town, it must have enough surplus of raw materials to support trade and a relatively large population. Bairoch points out that, due to sparse population densities that would have persisted in pre-Neolithic, hunter-gatherer societies, the amount of land that would be required to produce enough food for subsistence and trade for a large population would make it impossible to control the flow of trade. To illustrate this point, Bairoch offers an example: "Western Europe during the pre-Neolithic, [where] the density must have been less than 0.1 people per square kilometer". Using this population density as a base for calculation, and allotting 10% of food towards surplus for trade and assuming that town dwellers do no farming, he calculates that "...to maintain a town with a population of 1,000, and without taking the cost of transportation into account, an region of 100,000 square kilometers would have been required. When the cost of transportation is taken into account, the figure rises to 200,000 square kilometers ...". Bairoch noted that this is roughly the size of Great Britain.

The urban theorist Jane Jacobs suggests that town -formation preceded the birth of farming, but this view is not widely accepted.

In his book *Town Economics*, Brendan O'Flaherty asserts "Cities could persist—as they have for thousands of years—only if their advantages offset the disadvantages" (O'Flaherty 2005, p. 12). O'Flaherty illustrates two similar attracting advantages known as increasing returns to scale and economies of scale, which are ideas normally associated with firms. Their applications are seen in more basic economic systems as well. Increasing returns to scale occurs when "doubling all inputs more than doubles the output [and] an activity has economies of scale if doubling output less than doubles cost" (O'Flaherty 2005, pp. 572–573). To offer an example of these ideas, O'Flaherty makes use of "one of the oldest reasons why cities were built: military protection" (O'Flaherty 2005, p. 13). In this example, the inputs are anything that would be used for protection (e.g., a wall) and the output is the region protected and everything of value contained in it. O'Flaherty then asks that we suppose the protected region is square, and each hectare inside it has the same value of protection. The advantage is expressed as: (O'Flaherty 2005, p. 13)

(1) $O = s^2$, where O is the output (region protected) and s stands for the length of a side. This equation shows that output is proportional to the square of the length of a side.

The inputs depend on the length of the perimeter:

(2) I = 4s, where I stands for the quantity of inputs. This equation shows that the perimeter is proportional to the length of a side.

So there are increasing returns to scale:

(3) $O = I^2/16$. This equation (solving for $\sin(1)$ and substituting in (2)) shows that with twice the inputs, you produce quadruple the output.

Also, economies of scale:

(4) $I = 4O^{1/2}$. This equation (solving for *I* in equation (3)) shows that the same output requires less input.

"Cities, then, economize on protection, and so protection against marauding barbarian armies is one reason why people have come together to live in cities ..." (O'Flaherty 2005, p. 13).

Similarly, "Are Cities Dying?", a paper by Harvard economist Edward L. Glaeser, delves into similar reasons for town formation: reduced transport costs for goods, people, and ideas. Discussing the benefits of proximity, Glaeser claims that if you double a town size, workers have a ten-percent increase in earnings. Glaeser furthers his argument by stating that bigger cities do not pay more for equal productivity than in a smaller town, so it is reasonable to assume that workers become more productive if they move to a town twice the size as they initially worked in. However, the workers do not benefit much from the ten-percent wage increase, because it is recycled back into the higher cost of living in a bigger town. They do gain other benefits from living in cities, though.

5.1.2 Geography

Town planning has seen many different schemes for how a town should look. The most commonly seen pattern is the grid, used for thousands of years in China, independently invented by Alexander the Great's town planner Dinocrates of Rhodes and favored by the Romans, while almost a rule in parts of pre-Columbian America. Derry, begun in 1613, was the first planned town in Ireland, with the walls being completed five years later. The central diamond within a walled town with four gates was considered a good design for defence. The grid pattern was widely copied in the colonies of British North America.

The Ancient Greeks often gave their colonies around the Mediterranean a grid plan. One of the best examples is the town of Priene. This town had different specialized districts, much as is seen in modern town planning today. Fifteen centuries earlier, the Indus Valley Civilization was using grids in such cities as Mohenjo-Daro. In medieval times there was evidence of a preference for linear planning. Good examples are the cities established by various rulers in the south of France and town expansions in old Dutch and Flemish cities.

Grid plans were popular among planners in the 19th century, particularly after the redesign of Paris. They cut through the meandering, organic streets that followed old paths. The United States imposed grid plans in new territories and towns, as the American West was rapidly established, in places such as Salt Lake Town and San Francisco.

Other forms may include a radial structure, in which main roads converge on a central point. This was often a historic form, the effect of successive growth over long time with concentric traces of town walls and citadels. In more recent history, such forms were supplemented by ring-roads that take traffic around the outskirts of a town. Many Dutch cities are structured this way: a central square surrounded by concentric canals. Every town expansion would imply a new circle (canals together with town walls). In cities such as Amsterdam, Haarlem, and also Moscow, this pattern is still clearly visible.

5.1.3 History

Towns and cities have a long history, although opinions vary on whether any particular ancient settlement can be considered a town. A town formed as central places of trade for the benefit of the members living in close proximity to others facilitates interaction of all kinds. These interactions generate both positive and negative externalities between others' actions. Benefits include reduced transport costs, exchange of ideas, sharing of natural resources, large local markets, and later in their development, amenities such as running water and sewage disposal. Possible costs would include higher rate of crime, higher mortality rates, higher cost of living, worse pollution, traffic and high commuting times. Cities grow when the benefits of proximity between people and firms are higher than the cost.

The first true towns are sometimes considered large settlements where the inhabitants were no longer simply farmers of the surrounding region, but began to take on specialized occupations, and where trade, food storage and power was centralized. In 1950 Gordon Childe attempted to define a historic town with 10 general metrics. These are:

- 1. Size and density of the population should be above normal.
- 2. Differentiation of the population. Not all residents grow their own food, leading to specialists.
- 3. Payment of taxes to a deity or king.
- 4. Monumental public buildings.
- 5. Those not producing their own food are supported by the king.
- 6. Systems of recording and practical science.
- 7. A system of writing.
- 8. Development of symbolic art.
- 9. Trade and import of raw materials.
- 10. Specialist craftsmen from outside the kin-group.

This categorization is descriptive, and it is used as a general touchstone when considering ancient cities, although not all have each of its characteristics.

One characteristic that can be used to distinguish a small town from a large town is organized government. A town accomplishes common goals through informal agreements between neighbors or the leadership of a chief. A town has professional administrators, regulations, and some form of taxation (food and other necessities or means to trade for them) to feed the government workers. The governments may be based on heredity, religion, military power, work projects (such as canal building), food distribution, land ownership, farming, commerce, manufacturing, finance, or a combination of those. Societies that live in cities are often called civilizations.

5.1.3.1 Ancient times

Early cities developed in a number of regions of the ancient world. Mesopotamia can claim the earliest cities, Eridu, Uruk, and Ur. After Mesopotamia, this culture arose in Syria and Anatolia, as shown by the town of Çatalhöyük (7500–5700BC). It is the largest Neolithic site found to date. Although it has sometimes been claimed that ancient Egypt lacked Urbanism, several types of urban settlements were found in ancient times.

The Indus Valley Civilization and ancient China are two other regions with major indigenous urban traditions. Among the early Old World cities, Mohenjo-daro of the Indus Valley Civilization in present-day Pakistan, existing from about 2600 BC, was one of the largest, with a population of 50,000 or more.

In ancient Greece, beginning in the early 1st millennium BC, there emerged independent town -states that evolved for the first time the notion of citizenship, becoming in the process the archetype of the free town , the polis. The Agora, meaning "gathering place" or "assembly", was the center of athletic, artistic, spiritual and political life of the polis. These Greek town -states reached great levels of prosperity that resulted in an unprecedented cultural boom, that of classical Greece, expressed in architecture, drama, science, mathematics and philosophy, and nurtured in Athens under a democratic government. The Greek Hippodamus of Miletus (c. 407 BC) has been dubbed the "Father of Town Planning" for his design of Miletus; the Hippodamian, or grid plan, was the basis for subsequent Greek and Roman cities. In the 4th century BC, Alexander the Great commissioned Dinocrates of Rhodes to lay out his new town of Alexandria, the grandest example of idealized urban planning of the ancient Mediterranean world, where the town 's regularity was facilitated by its level site near a mouth of the Nile.

This roster of early urban traditions is notable for its diversity. Excavations at early urban sites show that some cities were sparsely populated political capitals, others were trade centers, and still other cities had a primarily religious focus. Some cities had large dense populations, whereas others carried out urban activities in the realms of politics or religion without having large associated populations. Theories that attempt to explain ancient Urbanism by a single factor, such as economic benefit, fail to capture the range of variation documented by archaeologists.

The growth of the population of ancient civilizations, the formation of ancient empires concentrating political power, and the growth in commerce and manufacturing led to ever greater capital cities and centres of commerce and industry, with Alexandria, Antioch and Seleucia of the Hellenistic civilization, Pataliputra (now Patna) in India, Chang'an (now Xi'an) in China, Carthage, ancient Rome, its eastern successor Constantinople (later Istanbul).

Keith Hopkins estimates that ancient Rome had a population of about a million people by the end of the 1st century BC, after growing continually during the 3rd, 2nd, and 1st centuries BC, making it the largest town in the world at the time. Alexandria's population was also close to Rome's population at around the same time, the historian Rostovtzeff estimates a total population close to a million based on a census dated from 32 AD that counted 180,000 adult male citizens in Alexandria.

Cities of Late Antiquity underwent transformations as the urban power base shrank and was transferred to the local bishop. Cities essentially disappeared, earliest in Roman Britain and Germania and latest in the Eastern Roman Empire and Visigothic Spain.

In the ancient Americas, early urban traditions developed in the Andes and Mesoamerica. In the Andes, the first urban centers developed in the Norte Chico civilization (also Caral or Caral-Supe civilization), Chavin and Moche cultures, followed by major cities in the Huari, Chimu and Inca cultures. The Norte Chico civilization included as many as 30 major population centers in what is now the Norte Chico region of north-central coastal Peru. It is the oldest known civilization in the Americas, flourishing between the 30th century BC and the 18th century BC. Mesoamerica saw the rise of early Urbanism in several cultural regions, including the Preclassic Maya, the Zapotec of Oaxaca, and Teotihuacan in central Mexico. Later cultures such as the Aztec drew on these earlier urban traditions.

In the first millennium AD, an urban tradition developed in the Khmer region of Cambodia, where Angkor grew into one of the largest cities (in region) of the world. The closest rival to Angkor, the Mayan town of Tikal in Guatemala, was between 100 and 150 square kilometers (39 and 58 sq mi) in total size. Although its population remains a topic of research and debate, newly identified agricultural systems in the Angkor region may have supported up to one million people.

Farming was practiced in sub-Saharan Africa since the third millennium BC. Because of this, cities were able to develop as centers of non-agricultural activity. Exactly when this first happened is still a topic of archeological and historical investigation. Western scholarship has tended to focus on cities in Europe and Mesopotamia, but emerging archeological evidence indicates that urbanization occurred south of the Sahara well before the influence of Arab urban culture. The oldest sites documented thus far are from around 500 AD including Awdaghust, Kumbi-Saleh the ancient capital of Ghana, and Maranda a center located on a trade route between Egypt and Gao.

5.1.3.2 Middle Ages

While David Kessler and Peter Temin consider ancient Rome the largest town before the 19th century, London was the first to exceed a population of 1 million. George Modelski considers medieval Baghdad,

with an estimated population of 1.2 million at its peak, the largest town before 19th century London and the first with a population of over one million. Others estimate that Baghdad's population may have been as large as 2 million in the 9th century.

From the 9th through the end of the 12th century, the town of Constantinople, capital of the Byzantine Empire, was the largest and wealthiest town in Europe, with a population approaching 1 million.

During the European Middle Ages, a town was as much a political entity as a collection of houses. Town residence brought freedom from customary rural obligations to lord and community: *"Stadtluft macht frei"* ("Town air makes you free") was a saying in Germany. In Continental Europe cities with a legislature of their own were not unheard of, the laws for towns as a rule other than for the countryside, the lord of a town often being another than for surrounding land. In the Holy Roman Empire some cities had no other lord than the emperor. In Italy medieval communes had quite a statelike power. In exceptional cases like Venice, Genoa or Lübeck, cities themselves became powerful states, sometimes taking surrounding regions under their control or establishing extensive maritime empires. Similar phenomena existed elsewhere, as in the case of Sakai, which enjoyed a considerable autonomy in late medieval Japan.

5.1.3.3 Early modern

While the town -states, or poleis, of the Mediterranean and Baltic Sea languished from the 16th century, Europe's larger capitals benefited from the growth of commerce following the emergence of an Atlantic trade. By the early 19th century, London had become the largest town in the world with a population of over a million, while Paris rivaled the well-developed regionally traditional capital cities of Baghdad, Beijing, Istanbul and Kyoto. During the Spanish colonization of the Americas the old Roman town idea was extensively used. Cities were founded in the middle of the newly conquered territories, and were bound to several laws about administration, finances and Urbanism.

Most towns remained far smaller, so that in 1500 only some two dozen places in the world contained more than 100,000 inhabitants. As late as 1700, there were fewer than forty, a figure that rose to 300 in 1900. A small town of the early modern period might contain as few as 10,000 inhabitants, a town far fewer.

5.1.3.4 Industrial age

The growth of modern industry from the late 18th century onward led to massive urbanization and the rise of new great cities, first in Europe and then in other regions, as new opportunities brought huge numbers of migrants from rural communities into urban regions. In the United States from 1860 to 1910, the invention of railroads reduced transportation costs, and large manufacturing centers began to emerge, thus allowing movement from rural to town regions. However, cities during those periods of time were deadly places to live in, due to health problems resulting from contaminated water and air, and communicable diseases. In the Great Depression of the 1930s cities were hard hit by unemployment, especially those with a base in heavy industry. In the U.S. urbanization rate increased forty to eighty percent during 1900–1990. Today the world's population is slightly over half urban, with millions still streaming annually into the growing cities of Asia, Africa and Latin America.

5.1.4 External effects

Modern cities are known for creating their own microclimates. This is due to the large clustering of heat absorbent surfaces that heat up in sunlight and that channel rainwater into underground ducts.

Waste and sewage are two major problems for cities, as is air pollution coming from various forms of combustion, including fireplaces, wood or coal-burning stoves, other heating systems, and internal combustion engines. The impact of cities on places elsewhere, be it hinterlands or places far away, is considered in the notion of town footprinting (*ecological footprint*). Other negative external effects include health consequences such as communicable diseases, crime, and high traffic and commuting times. Cities cause more interaction with more people than rural regions, thus a higher likelihood of contracting contagious diseases. However, many inventions such as inoculations, vaccines, and water filtration systems have also lowered health concerns. Crime is also a concern in the cities. Studies have shown that crime rates in cities are higher and the chance of punishment after getting caught is lower. In cases such as burglary, the higher concentration of people in cities creates more items of higher value worth the risk of crime. The high concentration of people also makes using automobiles inconvenient and pedestrian traffic is more prominent in metropolitan regions than a rural or suburban one.

Cities also generate positive external effects. The close physical proximity facilitates knowledge spillovers, helping people and firms exchange information and generate new ideas. A thicker labor market allows for better skill matching between firms and individuals. Population density enables also sharing of common infrastructure and production facilities, however, very dense cities, increased crowding and waiting times may lead to some negative effects. Another positive external effect of cities comes from the diverse social opportunities created when people of different backgrounds are brought together. Larger cities typically offer a wider variety of social interests and activities, letting people of all backgrounds find something they can be involved in.

Cities may, however, also have a positive influence on the environment. UN-HABITAT stated in its reports that town living can be the best solution for dealing with the rising population numbers (and thus still be a good approach on dealing with overpopulation) This is because cities concentrate human activity into one place, making the environmental damage on other places smaller. However, this can only be achieved if urban planning is improved and if town services are properly maintained.

5.1.5 Global cities

A global town, also known as a world town, is a prominent center of trade, banking, finance, innovation, and markets. The term "global town ", as opposed to megatown , was coined by Saskia Sassen in a seminal 1991 work. Whereas "megatown " refers to any town of enormous size, a global town is one of enormous power or influence. Global cities, according to Sassen, have more in common with each other than with other cities in their host nations. Notable examples of such cities include São Paulo, London, Istanbul, New York Town , Hong Kong, Paris, Shanghai, Singapore, Mexico Town , and Tokyo.

The notion of global cities is rooted in the concentration of power and capabilities within all cities. The town is seen as a container where skills and resources are concentrated: the better able a town is to concentrate its skills and resources, the more successful and powerful the town. This makes the town itself more powerful in the sense that it can influence what is happening around the world. Following this view of cities, it is possible to rank the world's cities hierarchically.

Critics of the notion point to the different realms of power. The term *global town* is heavily influenced by economic factors and, thus, may not account for places that are otherwise significant. For example, cities like Istanbul, Jerusalem, Karbala, Lisbon, Mashhad, Mecca, and Rome are powerful in religious and historical terms but would not be considered "global cities." Additionally, it has been questioned whether the town itself can be regarded as an actor.

In 1995, Kanter argued that successful cities can be identified by three elements: good thinkers (idea), good makers (competence) or good traders (connections). The interplay of these three elements, Kanter argued, means that good cities are not planned but managed.

5.1.6 Inner town

In the United States, United Kingdom and Ireland, the term "inner town " is sometimes used with the connotation of being a region, perhaps a ghetto, where people are less wealthy and where there is more crime. These connotations are less common in other Western countries, as deprived regions are located in varying parts of other Western cities. In fact, with the gentrification of some formerly run-down central town regions the reverse connotation can apply. In Australia, for example, the term "outer suburban" applied to a person implies a lack of sophistication. In Paris, the inner town is the richest part of the metropolitan region, where housing is the most expensive, and where elites and high-income individuals dwell. In the developing world, economic modernization brings poor newcomers from the countryside to build haphazardly at the edge of current settlement.

The United States, in particular, has a culture of anti-Urbanism that dates back to colonial times. The American Town Beautiful architecture movement of the late 19th century was a reaction to perceived urban decay and sought to provide stately civic buildings and boulevards to inspire civic pride in the motley residents of the urban core. Modern anti-urban attitudes are found in the United States in the form of a planning profession that continues to develop land on a low-density suburban basis, where access to amenities, work and shopping is provided almost exclusively by car rather than by foot or transit.

However, there is a growing movement in North America called "New Urbanism" that calls for a return to traditional town planning methods where mixed-use zoning allows people to walk from one type of land-use to another. The idea is that housing, shopping, office space, and leisure facilities are all provided within walking distance of each other, thus reducing the demand for road-space and also improving the efficiency and effectiveness of mass transit.

5.1.7 21st century

There is a debate about whether technology and instantaneous communications are making cities obsolete, or reinforcing the importance of big cities as centres of the knowledge economy. Knowledge-based development of cities, globalization of innovation networks, and broadband services are driving forces of a new town planning paradigm towards intelligent cities. Intelligent / smart cities use technology and communication to create more efficient agglomerations in terms of competitiveness, innovation, environment, energy, utilities, governance, and delivery of services to the citizen. Some companies are building brand new master planned cities from scratch on greenfield sites.

5.2 Models of Urban Systems

There are two ways to think about models of urban systems -- those that develop in abstract form (primarily in Christoler's Central Place Theory) and those that developed using a combination of physical geography and technology, such as the series of epochs of urbanization in North America developed by

John Borchert. His work is important because it can be used in several scales both at the town level, but also within town boundaries.

Christoler's Central Place Theory is fun to teach. It is fun to show how the geometry works, but it is most important for students to understand the fundamental ideas behind the Central Place Theory. The ideas of threshold and range are useful in understanding human behavior and urbanization. Students are quick to reject the hierarchical structure and hexagonal hinterlands developed by the Christoler model because they are abstract, and students have a hard time understanding the utility of an abstract model. But they find validity in the ideas of threshold and range and are able to use them. After some discussion, students also understand the utility of the ideas of hierarchy, and the levels of goods, service, and differentiation of places according to the level in the hierarchy. These are all extremely important ideas and help students think about the development of cities and industrial activity.

Borchert's systems are based on the impact of the evolution of transportation and communication technology on the development of the North American system and also make use of the idea of the system of hierarchy. Borchert discusses the way cities' growth and decline affects their position in the hierarchy. He has been able to define different periods or epochs in North America based on the technology that significantly impacted urbanization. Students should also pay close attention to the idea of innovation waves so they can understand how technology will have great impact on the location and nature of urbanization in the future. Unfortunately, not all textbooks provide an adequate treatment of the Borchert system of epochs.

The Borchert's system starts with the Sail and Wagon Epoch from 1790-1830. During this period, the movement of people was limited and slow because of the difficulty of overland transportation; primary goods were moved along waterways. The system changed with the development of steam and its application to boats and early railroads. Hence the second epoch is called the Steamboat Iron Horse Epoch and runs from 1830 to1870. The third epoch is called the Steel Rail or long haul, which runs from 1870 to1920, which coincided with the Industrial Revolution. Cities expanded their hinterlands dramatically; goods were moved long distances, making it possible to develop intensively industrialized regions. The fourth period -- running from roughly from 1920 to1970, but really continuing into the present -- is called the Auto/Air Amenity Epoch. The urban system has been transformed dramatically by the use of automobiles, which opened up new locations for development. Many people now believe we are in our fifth epoch, the so-called High Technology Epoch or Telecommunications Epoch, since both are shaping cities in many ways.

Another model that is fundamental to thinking about urban geography is the so-called rank size rule or the hierarchical model. This model basically says that cities can be all put into one system based on their size, so that the largest town is ranked number one and so on down to the smallest town. When this is done on a graph, you see two or three types of town systems, including the primate town, where the graph steeply falls away from the first rank, and the more advanced urban systems, where the relationship between population and size is more of a straight line.

5.2.1 Central place theory

Central place theory is a geographical theory that seeks to explain the number, size and location of human settlements in an urban system. The theory was created by the German geographer Walter Christaller, who asserted that settlements simply functioned as 'central places' providing services to surrounding regions.

5.2.1.1 Building the theory

To develop the theory, Christaller made the following simplifying assumptions:

- An unbounded isotropic (all flat), homogeneous, limitless surface (abstract space)
- An evenly distributed population
- All settlements are equidistant and exist in a triangular lattice pattern
- Evenly distributed resources
- Distance decay mechanism
- Perfect competition and all sellers are economic people maximizing their profits
- Consumers are of the same income level and same shopping behavior
- All consumers have a similar purchasing power and demand for goods and services
- Consumers visit the nearest central places that provide the function which they demand. They minimize the distance to be travelled
- No provider of goods or services is able to earn excess profits (each supplier has a monopoly over a hinterland)

Therefore the trade regions of these central places who provide a particular good or service must all be of equal size

- There is only one type of transport and this would be equally easy in all directions
- The transport cost is proportional to distance traveled in example, the longer the distance traveled, the higher the transport cost

The theory then relied on two ideas: *threshold* and *range*.

- Threshold is the minimum market (population or income) needed to bring about the selling of a particular good or service.
- Range is the maximum distance consumers are prepared to travel to acquire goods at some point the cost or inconvenience will outweigh the need for the good.

The result of these consumer preferences is that a system of centers of various sizes will emerge. Each center will supply particular types of goods forming levels of hierarchy. In the functional hierarchies, generalizations can be made regarding the spacing, size and function of settlements.

- 1. The larger the settlements are in size, the fewer in number they will be, i.e. there are many small villages, but few large cities.
- 2. The larger the settlements grow in size, the greater the distance between them, i.e. villages are usually found close together, while cities are spaced much further apart.
- 3. As a settlement increase in size, the range and number of its functions will increase .
- 4. As a settlement increase in size, the number of higher-order services will also increase, i.e. a greater degree of specialization occurs in the services.

The higher the order of the goods and services (more durable, valuable and variable), the larger the range of the goods and services, the longer the distance people are willing to travel to acquire them.

At the base of the hierarchy pyramid are shopping centres, newsagents etc. which sell low order goods. These centres are small. At the top of the pyramid are centres selling high order goods. These centres are large. Examples for low order goods and services are: newspaper stalls, groceries, bakeries and post

offices. Examples for high order goods and services are: Jewellery, large shopping arcades and malls. They are supported by a much larger threshold population and demand.

5.2.1.2 Predictions of the theory

From this he deduced that settlements would tend to form in a triangular/hexagonal lattice, this being the most efficient pattern to serve regions without any overlap.

In the orderly arrangement of an urban hierarchy, seven different principal orders of settlement have been identified by Christaller, providing different groups of goods and services. Settlement is regularly spaced - equidistant spacing between same order centers, with larger centers farther apart than smaller centers. Settlements have hexagonal market regions, and are most efficient in number and functions.

The different layouts predicted by Christaller have *K*-values which show how much the Sphere of Influence of the central places takes on — the central place itself counts as 1 and each portion of a satellite count as its portion:

K = 3 Marketing principle



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K = 3 Principle

According to the marketing principle K = 3, the market region of a higher-order place (node) occupies 1/3rd of the market region of each of the consecutive lower size places (node) which lies on its neighbor; the lower size nodes (6 in numbers and 2nd larger circles) are located at the corner of a larger hexagon around the high-order settlement. Each high-order settlement gets 1/3rd of each satellite settlement (which are 6 in total), thus $K = 1 + 6 \times 1/3 = 3$.

However, although in this K = 3 marketing network the distance traveled is minimized, the transport network is not the most efficient, because there are no intermediate transport links (network) between the larger places (nodes).

K = 4 Transport/Traffic principle



K = 4 Principle

According to K = 4 transport principle, the market region of a higher-order place includes a half of the market region of each of the six neighboring lower-order places, as they are located on the edges of hexagons around the high-order settlements. This generates a hierarchy of central places which results in the most efficient transport network. There are maximum central places possible located on the main transport routes connecting the higher order center. The transportation principle involves the minimization of the length of roads connecting central places at all hierarchy levels. In this system of nesting, the lower order centres are all located along the roads linking the higher order centres. This alignment of places along a road leads to the minimization of road length. However, for each higher order center, there are now four centres of immediate lower order, as opposed to three centres under the marketing principle.

K = 7 Administrative principle



5

K = 7 Principle

According to K = 7 administrative principle (or political-social principle), settlements are nested according to sevens. The market regions of the smaller settlements are completely enclosed within the market region of the larger settlement. Since tributary regions cannot be split administratively, they must be allocated exclusively to a single higher-order place. Efficient administration is the central principle in this hierarchy.

5.2.1.3 Evaluation

The validity of the central place theory may vary with local factors, such as climate, topography, history of development, technological improvement and personal preference of consumers and suppliers.

Economic status of consumers in a region is also important. Consumers of higher economic status tend to be more mobile and therefore bypass centers providing only lower order goods. The application of central place theory must be tempered by an awareness of such factors when planning shopping center space location.

Purchasing power and density affect the spacing of centers and hierarchical arrangements. Sufficient densities will allow, for example, a grocery store, a lower order function, to survive in an isolated location.

Factors shaping the extent of market regions:

5

- Land use: industrial regions can provide little in the way of a consuming population
- Poor accessibility: this can limit the extent of a center's market region
- Competition: this limits the extent of market regions in all directions
- Technology: high mobility afforded by the automobile allows overlapping of market regions

Market region studies provide another technique for using central place theory as a retail location planning tool. The hierarchy of shopping centers has been widely used in the planning of "new towns". In this new town, the hierarchy of business centers is evident. One main shopping center provides mostly durable goods (higher order); district and local shopping centers supply, increasingly, convenience (lower order) goods. These centers provided for in the new town plan are not free from outside competition. The impacts of surrounding existing centers on the new town centers cannot be ignored.

5.2.1.4 Examples

The newly reclaimed polders of the Netherlands provide anisotropic plane on which settlements have developed and in certain regions 6 small towns can be seen surrounding a larger town, especially in the Noord-Oostpolder and Flevoland. The Fens of East Anglia in the UK also provide a large expanse of flat land with no natural barriers to settlement development. Cambridge is a good example of a K=4 Transport Model Central Place, although it is surrounded by 7, rather than 6, settlements. Each satellite is 10–15 miles from Cambridge and each lies on a major road leading out of Cambridge:

- Ely A10 north
- Newmarket A1303 (now bypassed by A14/A11) northeast
- Haverhill A1307 southeast
- Saffron Walden A1301 south
- Royston A10 southwest
- St Neots A428 west
- St Ives A14 northwest

As all of the satellite settlements are on transport links, this is a good example of a K=4 CPT model (although in this case it is K=4.5 due to 7 rather than 6 settlements).

Another example of the use of CPT was in the delineation of Medical Care Regions in California. A hierarchy of primary, secondary and tertiary care cities was described, and the population size and income needed to support each medical care specialty in California determined.

5.2.1.5 Criticism

The Central Place Theory has been criticized for being static; it does not incorporate the temporal aspect in the development of central places. Furthermore, the theory holds up well when it comes to agricultural regions, but not industrial or postindustrial regions due to their diversified nature of various services or their varied distribution of natural resources.

5.2.1.6 Newer developments

Newer theoretical developments have shown that it is possible to overcome the static aspect of CPT. Veneris (1984) developed a theoretical model which starts with (a) a system of evenly distributed ("medieval") towns; (b) new economic activities are located in some towns thus causing differentiation and evolution into an hierarchical ("industrial") town system; (c) further differentiation leads into a posthierarchical ("postindustrial") town system. This evolution can be modelled by means of the three major CPT theories: stage (a) is a system of von Thunen "isolated states"; stage (b) is a Christallerian hierarchical system; stage (c) is a Löschian post-hierarchical system. Furthermore, stage (b) corresponds to Chris Alexander's "tree" town , while (c) is similar to his "lattice" system (following his dictum "the town is not a tree").

5.2.1.7 The importance of a Town and other Theoretical Considerations

According to Smith, Walter Christaller erred in his development of CPT in 1930 by using size of population and number of telephones in determining the importance of a town . Smith recognized that although the population size was important to the region served by a town , the number of kinds of services offered there was more important as a measure of the importance of a town in attracting consumers. In applying CPT to describe the delivery of medical care in California, Smith counted the number of physician specialties to determine the importance of a town in the delivery of medical care.

Christaller also erred in the assumption that cities "emerge". In California and much of the United States, many cities were situated by the railroads at the time the tracks were laid. In California, towns founded by the railroads were 12 miles apart, the amount of track a section crew could maintain in the 1850s; larger towns were 60 miles apart, the distance a steam engine could travel before needing water. Older towns were founded a day's walk apart by the Spanish priests who founded early missions.

In medical care regions described by Smith, there is a hierarchy of services, with primary care hopefully distributed throughout a region, middle sized cities offering secondary care, and metropolitan regions with tertiary care. Income, size of population, population demographics, distance to the next service center, all had an influence on the number and kind of specialists located in a population center. (Smith, 1977, 1979) For example, orthopedic surgeons are found in ski regions, obstetricians in the suburbs, and boutique specialties such as hypnosis, plastic surgery, psychiatry are more likely in high income regions. It was possible to estimate the size of the population (threshold) needed to support a specialty, and also to link specialties that needed to cooperate with each other, such as hematology, oncology, and pathology, or cardiology, thoracic surgery and pulmonology.

The distribution of medical care in California followed patterns having to do with the settlement of cities. Cities and their hinterlands having characteristics of the Traffic Principle usually have six thoroughfares through them—the thoroughfares including highways, rivers, railroads, and canals. They are more efficient and can deliver the lowest cost services because transportation is cheaper. Those having settled on the market principle (K=3 above) have more expensive services and goods, as they were founded at times when transportation was more primitive. In Appalachia, for example, the market principle still prevails and rural medical care is much more expensive.

5.2.1.8 Making Central Place Theory operational

CPT is often criticized as being "unrealistic". However, several studies show that it can describe existing urban systems. An important issue is that Christaller's original formulation is incorrect in several ways (Smith). These errors become apparent if we try to make CPT "operational", that is if we try to derive numerical data out of the theoretical schemata. These problems have been identified for by Veneris (1984) and subsequently by Openshaw and Veneris (2003), who provided also theoretically sound and consistent solutions, based on a K=3, 37-Centre CP system:

1. Closure problem. Christaller's original scheme implies an infinite landscape. Although each market has a finite size, the total system has no boundaries to it. Neither Christaller, nor the early related literature provide any guidance as to how the system can be "contained". Openshaw and Veneris (2003) identified three different types of closure, namely (a) isolated state, (b) territorial closure and (c) functional closure. Each closure type implies different population patterns.

2. Generating trips. Following the basic Christallerian logic and the closure types identified, Openshaw and Veneris (2003) calculate trip patterns between the 27 centres.

3. Calculating inter- and intra-zonal costs/distances. Christaller assumed freedom of movement in all directions, which would imply "airline" distances between centers. At the same time, he provided specific road networks for the CP system, which do not allow for airline distances. This is a major flaw which neither Christaller, nor early related literature have identified. Openshaw and Veneris (2003) calculate costs/distances which are consistent with the Christallerian principles.

5.2.1.9 Central Place Theory and Spatial Interaction Models

It was once thought that central place theory is not compatible with spatial interaction models (SIM). It is paradoxical however that sometimes towns or shopping centres are planned with CPT, and subsequently evaluated with SIM.

Openshaw and Veneris (2003) succeeded in linking these two major regional theories in a clear and theoretically consistent way: using the data they derived from the operationalization of CPT, they experimented with several SIM. Following a thorough investigation via computer simulation, they reached important theoretical and practical conclusions.

Smith was able to delineate medical care regions (the range), describe the hierarchy of medical services, the population base required of each medical specialty (threshold), the efficiency of regions, and the importance of how a region was settled to the delivery of medical care, that is, according to traffic, market or administrative principles.

5.3 Built Environment and Social Space

5.3.1 Built environment

The term built environment refers to the human-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks or green space to neighborhoods and cities that can often include their supporting infrastructure, such as water supply, or energy networks. The built environment is a material, spatial and cultural product of human labor that combines the physical elements and energy in forms for living, working and playing. It has been defined as "the human-made space in which people live, work, and recreate on a day-to-day basis". The "built environment encompasses places and spaces created or modified by people including buildings, parks, and transportation systems".

Early ideas of built environment were introduced thousands of years ago. Hippodamus of Miletos, known as the "father of urban planning", developed Greek cities from 498 BC to 408 BC that created order by using grid plans that mapped the town . These early town plans eventually gave way to the Town Beautiful movement in the late 1800s and early 1900s, inspired by Daniel Hudson Burnham, a reformist

for the Progressivism movement who actively promoted "a reform of the landscape in tandem with political change". The effort was in partnership with others who believed that beautifying American cities would improve the moral compass of the cities and encourage the upper class to spend their money in the cities. This beautification process included parks and architectural design.

5.3.1.1 Modern built environment

Presently built environments are typically used to describe the interdisciplinary field that addresses the design, construction, management, and use of these man-made surroundings as an interrelated whole as well as their relationship to human activities over time (rather than a particular element in isolation or at a single moment in time). The field is generally not regarded as a traditional profession or academic discipline in its own right, instead drawing upon regions such as economics, law, public policy, public health, management, geography, design, technology, and environmental sustainability. Within the field of public health, built environments are referred to as building or renovating regions in an effort to improve the community's well-being through the construction of "aesthetically, health improved, and environmentally improved landscapes and living structures". For example; community forest user group in Nepal is a multi - dimensional institution, which serves goods and services to the communities through natural resource management.

5.3.1.2 Urban planning

Within the field of academia studying "urban planning", there is some arguing that much of the environment we inhabit is man-made. They argue that these artificial surroundings are so extensive and cohesive that with regards to the consumption of resources, waste disposal, and productive enterprise, they are similar to organisms.

5.3.1.3 Public Health

In public health, built environment refers to physical environments that are designed with health and wellness as integral parts of the communities. Research has indicated that the way neighborhoods are created can affect both the physical activity and mental health of the communities' residents. Studies have shown that built environments that were expressly designed to improve physical activity are linked to higher rates of physical activity, which in turn, positively affects health.

The neighborhoods with more walkability had lower rates of obesity as well as increased physical activity among its residents. They also had lower rates of depression, higher social capital, and less alcohol abuse. Walkability features in these neighborhoods include safety, sidewalk construction, as well as destinations in which to walk. In addition, the perception of a walkable neighborhood, one that is perceived to have good sidewalks and connectivity, is correlated with higher rates of physical activity.

Assessments of walkability have been completed through the use of GIS programs. One such program, Street Smart Walk Score, is a walkability assessment tool which determines distances to grocery stores and other amenities, as well as connectivity and intersection frequency using specific addresses. Assessments such as Street Smart Walk Score can be utilized by town and county planning departments to improve the existing walkability of communities.

Public health also addresses additional components of built environments including "Bikeability" and healthy food access such as proximity to grocery stores and community gardens. Bikeability refers to the

access that a region has granted to safe biking through multiple bike paths and bike lanes. Both walkability and Bikeability have been cited as determinants of physical activity.

Access to healthy food is also an important component of the built environment. A higher density of convenience stores has been associated with obesity in children. In contrast, improved access to community supermarkets and farmer's markets is correlated with lower overweight status. Specifically in low income neighborhoods, the presence of a local grocery store is correlated with lower BMI/overweight risk. Community gardens are also considered a part of the built environment, and have been shown to increase fruit and vegetable intake among gardeners. Scholars say that community gardens have also been shown to have positive social and psychological impacts that lead to lower levels of stress, hypertension, and an improved sense of wellness, affecting the overall health of the individual and the community.

The intersection of public health with other disciplines is evident in the design process of built environments which includes environmental planning, policy development and land-use planning. Research suggests that people are more active in mixed-use communities or those that incorporate retail and residential and densely populated regions as well as those with good street connectivity. Those who preferred to walk and live in walkable environments often have lower obesity rates and drive less over those who preferred living in auto-dependent environments. The strength of the evidence for reducing obesity through environment has been highlighted by the Center for Disease Control in its Common Community Measures for Obesity Prevention Project, which includes measures of healthy food access and physical activity environments.

5.3.1.4 Landscape architecture

In landscape architecture, the built environment is understood to mean a human-made landscape, as distinguished from the natural environment; for example, a town park is a built environment.

5.3.2 Social Space

Social Space or public space is a social space that is generally open and accessible to people. Roads (including the pavement), public squares, parks and beaches are typically considered public space. Government buildings which are open to the public, such as public libraries are public space. Although not considered public space, privately owned buildings or property visible from sidewalks and public thoroughfares may affect the public visual landscape, for example, by outdoor advertising.

Public space has also become something of a touchstone for critical theory in relation to philosophy, (urban) geography, visual art, cultural studies, social studies and urban design. The term 'public space' is also often misconstrued to mean other things such as 'gathering place', which is an element of the larger idea of social space.

One of the earliest examples of public spaces are commons. For example, no fees or paid tickets are required for entry. Non-government-owned malls are examples of 'private space' with the appearance of being 'public space'.

5.3.2.1 Right to common passage

In Nordic countries like Norway, Sweden and Finland, all nature regions are considered public space, due to a law, the *allemansrätten* (the right of common passage).

5.3.2.2 Restrictions on state action in public spaces in the United States

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" If Members of the public had no right whatsoever to distribute leaflets or engage in other expressive activity on government-owned property...then there would be little if any opportunity to exercise their rights of freedom of expression.

—Supreme Court of Canada, defending right to poster on public utility poles and hand out leaflets in public government-owned buildings

In the United States the right of the people to engage in speech and assembly in public places may not be unreasonably restricted by the federal or state government. The government cannot usually limit one's speech beyond what is reasonable in a public space, which is considered to be a public forum (that is, screaming epithets at passers-by can be stopped; proselytizing one's religion probably cannot). In a private—that is, non-public—forum, the government can control one's speech to a much greater degree; for instance, protesting one's objection to Medicare reform will not be tolerated in the gallery of the United States Senate. This is not to say that the government can control what one says in their own home or to others; it can only control government property in this way.

Parks, malls, beaches, waiting rooms, etc., may be closed at night. As this does not exclude any specific group, it is generally not considered a restriction on public use. Entry to public parks cannot be restricted based upon a user's residence.

5.3.2.3 Social norms in public spaces

In some cultures, there is no expectation of privacy in a public space, however civil inattention is a process whereby individuals are able to maintain their privacy within a crowd.

Eating and drinking in an outside public place during Ramadan in an Islamic country is sometimes not appreciated. In some Islamic Theocracies it is a punishable offense enforced by religious police.

5.3.2.4 Controversy regarding restrictions on use

Public space is commonly shared and created for open usage throughout the community, whereas private space is individually or corporately owned. The region is built for a range of various recreation and entertainment. The physical setting is socially constructed which creates a behavior influence. Limitations are imposed on the space to prevent certain actions from occurring; public behavior that is considered obnoxious or out of character (i.e., drug and alcohol consumption, urinating, indecent exposure, etc.) are supported by law or ordinance. Through the landscape and spatial organization of public space, the social

construction is considered to be privately ruled: by the implicit and explicit rules and expectations of the space that are enforced.

Whilst it is generally considered that everyone has a right to access and use public space, as opposed to private space which may have restrictions, there has been some academic interest in how public spaces are managed to exclude certain groups - specifically homeless people and young people.

Measures are taken to make the public space less attractive to them, including the removal or design of benches to restrict their use for sleeping and resting, restricting access to certain times, locking indoor/enclosed regions. Police forces are sometimes involved in moving 'unwanted' members of the public from public spaces. In fact, by not being provided suitable access, disabled people are implicitly excluded from some spaces.

5.3.2.5 As a site for democracy

Human geographers have argued that in spite of the exclusions that are part of public space, it can nonetheless be conceived of as a site where democracy becomes possible. Geographer Don Mitchell has written extensively on the topic of public space and its relation to democracy, employing Henri Lefebvre's notion of the right to the town in articulating his argument. While democracy and public space don't entirely coincide, it is the potential of their intersection that becomes politically important. Other geographers like Gill Valentine have focused on performativity and visibility in public spaces, which brings a theatrical component or 'space of appearance' that is central to the functioning of a democratic space.

5.3.2.6 Privatization

A **privately owned public space** is a public space that is open to the public, but owned by a private entity, typically a commercial property developer. Conversion of publicly owned public spaces of privately owned public spaces is referred as the privatization of public space, and is a common result of urban redevelopment.

Beginning roughly in the 1960s, the wholesale privatization of public space (especially in urban centers) has become a fact of western society, and has faced criticism from citizen groups such as the Open Spaces Society. Private-public partnerships have taken significant control of public parks and playgrounds through conservancy groups set up to manage what is considered unmanageable by public agencies. Corporate sponsorship of public leisure regions is ubiquitous, giving open space to the public in exchange for higher air rights. This facilitates the construction of taller buildings with private parks.

In one of the newer U.S. incarnations of the private-public partnership, the business improvement district (BID), private organizations are allowed to tax local businesses and retail establishments so that they might provide special private services such as policing and increased surveillance, trash removal, or street renovation, all of which once fell under the control of public funds.

5.3.2.7 Semi-public spaces

A broader meaning of public space or place includes also places where everybody can come if they pay, like a café, train, or movie theater. A shop is an example of what is intermediate between the two meanings: everybody can enter and look around without obligation to buy, but activities unrelated to the purpose of the shop are not unlimitedly permitted.

The halls and streets (including Skyways) in a shopping center may be declared a public place and may be open when the shops are closed. Similarly for halls, railway platforms and waiting rooms of public transport; sometimes a travelling ticket is required. A public library is a public place. A rest stop or truck stop is a public space.

For these "semi-public" spaces stricter rules may apply than outside, e.g. regarding dress code, trading, begging, advertising, photography, propaganda, riding roller skates, skateboards, a Segway, etc.

5.3.2.8 Public space in design theory

Public space, as a term and as an idea in design, is volatile. There is much conversation around what constitutes public space, what role it plays, and how design should approach and deal with it.

5.3.2.9 Historical shift

Historically, public space in the west has been limited to town centres, piazzas, church squares, i.e. nearly always engineered around a central monument, which informs the program of the space. These spaces acted as the 'commons' of the people; a political, social and cultural arena, indeed Jürgen Habermas' idea of the public sphere links its emergence with the development of democracy. A good example of this is the New Deal projects. The New Deal was a brief period in the US under Roosevelt's government that produced a huge number of public works in an economic effort to boost employment during the depression. The result, however, was more than this. They constituted a legacy of what has been called the cultural infrastructure underlying American public space. The New Deal projects have been credited with significantly contributing to the quality of American life and encouraging unity between all aspects of the community. It has been recently argued, however, that the democratic ideal of public life through the use of public space has deteriorated. As our cities accelerate towards segregation (social, economic, cultural, ethnic), the opportunity for public interaction is on the decline. John Chase writes, "The importance of voluntary and obligatory participation in civic life has been usurped by the consciousness of the arbitrary nature of assigned cultural meanings and by the increasingly important role that consumption of goods and services plays in the formation of individual identity."

5.3.2.10 Modern critique

Modern architectural critics have lamented on the 'narrative of loss' within the public sphere. That is, modern society has withdrawn from public life that used to inform town centers. Political and social needs, and forums for expression, can now be accessed from the home. This sentiment is reflected in Michael Sorkin's and Mike Davis' declaration of "the end of public space" and the "destruction of any truly democratic urban spaces." Another side of the debate, however, argues that it is people who apply the meaning of public space, wherever it may be. It has been suggested that the ideas of public, space, democracy, and citizenship are being redefined by people through lived experience. Discussion has surfaced around the idea that, historically, public space has been inherently contradictory in the way that it has always been exclusively in who has been able to participate. This has caused the "counterpublics", as identified by Nancy Fraser, to establish their own public spaces to respond to their own concerns. These spaces are in constant flux, and in response, its users restructure and reinterpret the physical space. An example of this is in the African-American neighborhood, Baldwin Hills, Los Angeles. Here, a parking lot has evolved into a scene of intense commercial and social activity. Locals gather here to meet and socialize, sell and consume goods. The example has been used to illustrate that the historical idea of fixed public space around a monument is not viable for a contemporary diverse social range as "no single physical space can represent a completely inclusive 'space of democracy'."

5.3.2.11 Art in public space

This sense of flux and change, informs how contemporary public art has evolved. Temporal art in public spaces has been a long established practice. But the presence of public art has become increasingly prevalent and important within our contemporary cities. Temporal public art is so important because of its ability to respond to, reflect, and explore the context which it inhabits. Patricia Phillips describes the "social desire for an art that is contemporary and timely, that responds to and reflects its temporal and circumstantial context." Public art is an arena for investigation, exploration and articulation of the dense and diverse public landscape. Public art asks its audience to re-imagine, re-experience, re-view and re-live. In the design field, a heavy focus has been turned onto the town as needing to discover new and inspired ways to re-use, re-establish and re-invent the town , in step with an invigorated interest in re-juvinating our cities for a sustainable future. Contemporary design has become obsessed with the need to save the modern town from an industrialized, commercialized, urban pit of a death bed.

5.3.2.12 Approaching urban design

Contemporary perception of public space has now branched and grown into a multitude of non-traditional sites with a variety of programs in mind. It is for this reason that the way in which design deals with public space as a discipline, has become such a diverse and indefinable field.

Iris Aravot puts forward an interesting approach to the urban design process, with the idea of the 'narrative-myth'. Aravot argues that "conventional scrutiny and problem solving methods resulting in fragmentation... of the authentic experience of a town ... [and] something of the liveliness of the town as a singular entity is lost." The process of developing a narrative-myth in urban design involves analyzing and understanding the unique aspects of the local culture based on Cassirer's five distinctive "symbolic forms". They are myth and religion, art, language, history and science; aspects often disregarded by professional practice. Aravot suggests that the narrative-myth "imposes meaning specifically on what is still inexplicable", i.e. the essence of a town .

Review Questions

- 1. Define the Cities?
- 2. Explains the Development of Cities?
- 3. Explain the Models of Urban Systems?
- 4. Explain the Built Environment and Social Space?

Discussion Questions

Discuss the central place theory?

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