

DETERMINISM

INTRODUCTION

All human activities are controlled by nature—this was the basic principle of determinism. The supporters of this theory considered nature the active agent while human being was considered passive. Determinists thought nature to be the controlling agent of the evolution of communities, their history, culture, life style, attitude and decisions. Hippocrates (460-376 B.C.) believed that natural environment is responsible for 'determining the forms of human culture and its variation over space and time' (Glacken, 1967). Beginning from the latter half of the 18th century to first half of the 20th century, determinism brought about a dominant approach in geography. In a nutshell, determinism can be called the first scientific approach to interpret man and nature relationship. This approach was widely accepted up to the World War II.

8.1 DEVELOPMENT OF DETERMINISM

8.1.1 Ancient Age (1200 B.C. — 500 A. D.):

Determinism, though a modern term, existed since the ancient age. During 484-425 B.C. **Herodotus** declared, "All history must be treated geographically and all geography must be treated historically." He believed that human history is influenced by surrounding natural environment.

Hippocrates in 420 B.C. opined that natural elements, such as—humidity, temperature, topography, etc. work together in building of the characters of human races. **Aristotle** (384-322 B.C.) opined that human habitation depend upon climates. He divided the globe into three different climatic zones—frigid zone, temperate zone and torrid zone. He differentiated the Europeans and the Asians according to climate. He suggested that the north Europeans are daring but less intelligent due to their extreme cold climate. They can well control their land but are unable to conquer new regions. He also said that the south Asians are more intelligent than brave. So they are ruled over. Greece stands in the middle. So he thought that the location of Greece made its inhabitants both daring and intelligent. Greece was the most civilized state in Aristotle's time and he opined that the location of this country made it the best of all. Although critics find fault with this view. They argue that Aristotle glorified the race and nation he belonged to.

Greek philosophers thought that people living in the slopes receiving plenty of rainfall are taller, sober, more polite and braver than people living on the other side of the hill receiving less rainfall.

Thoughts of **Thucydides** and **Xenophon** bear the suggestion of determinism. They thought that the favourable natural environment and advantageous geographical location for trade and commerce worked together for the development of Athens. They also thought that good reputation of this city grew through economic progress and rich cultural exchange. **Eratosthenes** (234 B.C.) made some alteration of the climatic zones, stated by Aristotle. He opines that nature is responsible for the development of Rome. He has described how the shape of Italy, her topography, climate, connection with other regions, etc. worked together to build Rome stronger and more prosperous. He opined that the slopes of a region, its topography, climate, etc. deeply influence the race living there. His works strengthened the concept of determinism.

Rome **Strabo** (64 B.C.-20 A.D.) supported Aristotle's view in his book *Geographika*. **Claudius Ptolemy** (200 AD) also supported Aristotle's views. He found links between human habitation and latitudes.

8.1.2 Middle Age (500-1100 A.D.) :

No new concept grew during this age in Europe. The attitudes reflected in the works of the philosophers of this age are almost the same as those found in the works of the ancient masters. Philosophy of **Claudius Ptolemy** became the main theme for discussion of this age. Apart from this, **Aristotle's deterministic philosophy** was the most important point for discussion of the Christian scholars of Europe. In the absence of new concepts, European scholastic pursuits turned inward; so it is called the **Dark age**. The mostly debated topic of this age was Aristotle's theory – whether torrid zone is fit for living or not. **Cardinal Pierre d'Ailly** published his book in the first half of the 15th century to discuss climatic control in details, but he failed to reach a definite conclusion. **Aeneas Silvius** brought out his book in the middle of the 15th century and there he stated the possibility of human habitation in the torrid zone. **Albertus Magnus**, the most famous writer of the middle ages, gave his ideas about the relationship between latitude and habitation which is not different from the ideas of the ancient Greeks. He only added that people living close to the torrid zone have dark complexion. He also opined that if those people move to the temperate zone, their skin will turn fair.

Arabian philosophers made remarkable contributions in this age. The concept of determinism can be found in the Arabian philosophers and geographers. **Ibn Battuta**, **Al-Masudi**, **Al-Idrisi**, **Al-Battani**, etc. are remarkable Arabian thinkers. **Al-Masudi** states that people living in *Sham* (modern Syria) are different from people around it. This is because of the availability of water. Syrians are jolly and pleasure loving. **Arab** On the contrary, people living in deserts are bad tempered and irritable in nature. It signifies that environment acts as the main controller of human behaviour. He also says that the nomads living under the open sky are strong, healthy, resolute and wise.

The eminent Islamic scholar **Ibn-Hawqul** travelled along the African coast up to 20° south latitude and proved that the areas, considered habitationless by the Greeks, are actually densely populated. Later **Ibn-Battuta** accepted this view.

Al-Maqdisi (985 A.D.) divided the globe in fourteen climatic zones, and described the activities of the people living in these regions. He has given detailed description of the life of people living in the temperate and torrid zones and climatic influences on them.

Al-Biruni's book "Kitab-al-Hind", brought out in 1030 A.D., explains the influences of monsoon winds on the life and culture of Indians.

The concepts of idealistic determinism are found in **Ibn-Sina**, who is also called Avicenna. He believed that landscapes change according to nature's laws.

Ibn-Khaldun, the last Islamic scholar of the Middle Ages, enriched determinism. His book 'Muqaddimah', published in 1377 A.D., supported the concept of determinism in favour of climate. Like **Albertus Magnus**, he also opined that people with dark complexion would turn gradually fair complexioned, if they move to the temperate zones and their progeny would also be fair complexioned. He thought that the dry climate was responsible for nomadic culture. Ibn-Khaldun was considered by many scholars of the following years to be the first scholar to discuss the relationship between man and nature.

8.1.3 The Renaissance (1400-1600) :

The concept of determinism was revived during renaissance in Western Europe. This concept grew stronger with the discovery of new lands, investigations, travels and expeditions from the first half of 15th century. This concept is reflected in a book written by **Cluverius** in 1624. There is a description of Italy in six volumes. The writings of **Nathaniel Carpenter**, a British author, contain plenty of examples regarding climatic influence on human character. In 1566, **Jean Bodin** distinguished the northerners and southerners on the basis of natural environment. Northerners are cruel, barbarous and energetic, while southerners are cunning, vindictive. People living in the middle are more talented than the people in the north, more energetic and lively than the people in the south. For this reason they are influential.

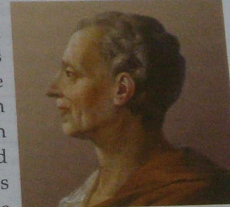


Fig. 8.1 Montesquieu

The concept of determinism is implied in "The Spirit of the Laws", written by the French scholar **Montesquieu**. He has explained overall climatic influence on culture, practice, laws, etc. According to him, people in colder regions are stronger and braver than people in warm regions. They are less suspicious and more simple, while people in warm regions are timid, lethargic and physically weak. If people of colder regions move to the warmer regions and settle there, negative influences become dominant on their behaviour. In his writing there are interesting explanations of geographical influences on religion and particularly that of soil and climate. According to Montesquieu, monarchy flourishes usually on fertile land; democracy on dry land and republic system on infertile land. The concept of possibilism is also found in his writing.

8.1.4 Eighteenth Century:

During this period, geography was mainly descriptive, hence no remarkable improvement of determinism is seen. **Immanuel Kant** (1724-1804) was the main deterministic geographer of this age. He gave explanations for the half closed eyes of the people of Holland. He said that the people of that country cannot see objects lying before them, until their heads are inclined backward. It is so because the land is infested with flies. He postulated that the presence of great number of flies has resulted in the evolution

of such human eyes. Kant's explanation of climatic influence on human figure is quite scientific. He proved that the people living in warm regions are timid in nature, which is the cause of their becoming superstitious. People in warm regions, being less energetic, eventually become slaves. He noticed the influence of environment on other species also. He said that brown squirrels turn grey when they move to Siberia. Determinism is suggested by some historians and sociologists in the latter half of the 18th century. According to **Stocking**, the works of ethnologists of this period reflect the relation between races and climate.

8.1.5 Nineteenth Century :

In the nineteenth century, geography was started to be acknowledged as a natural science. **Carl Ritter's** views were based on anthropology. The conception of geographical determinism was started to be accepted because of his research works. Ritter was curious about the rise of different human races in different natural environment. He viewed Africa to be the land of blacks, Europe to be the land of whites and Asia to be the land of men with brown complexion. He tried to explain the change of body structure, physical and mental health, density of population, etc. with the change of environment. He opined that people in Turkey have narrow opening of eyelids because of the direct effect of the desert.

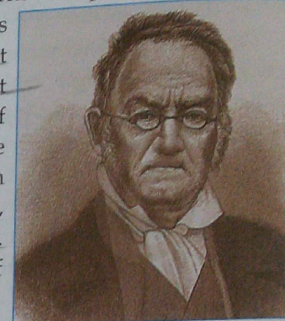


Fig. 8.2 Carl Ritter

Determinism is implied in the works of **Humboldt**, the famous German geographer, accepted as a notable pioneer of the subject. He opined that the differences of life styles between the races living in hills and plains are caused by two contrasting natural environments.

Determinism is clearly reflected in the works of **Frederic Le Play** (1879), the famous French sociologist. He has demonstrated that the European civilizations grow and develop in completely three different environments. Three different kinds of societies can be found in the vast grassland of *Steppe region*, *coastal regions* and *forest*

regions. Patriarchal nomadic society is there in the *steppe region*. The same patriarchal social system is found in families settled in European *coastal regions* where plenty of fish is available. The oldest man in a family is responsible for controlling the entire family property and it is inherited by eldest male child of the family. Soil type differs in varied *forest lands*, as a result of which, the families living here move from place to place. Later most of these families migrated to America (Dickinson, 1969). Thus he linked work, family and place with nature.

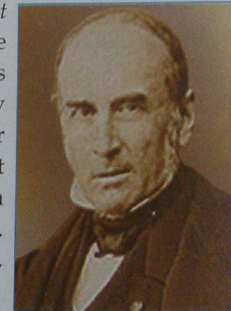


Fig. 8.3 Frederic Le Play

Edmond Demolins, like his teacher Frederic Le Play, came to the conclusion that family relations, responsibilities, etc. are influenced by geographical environment. In his books brought out in two volumes in 1901 and 1903, he has shown how different human races arose under the influence of different

environments. For example, Mongolian tribes have arisen in the grassland of Asia; the tribe of Eskimos and Laps in Siberia and American Tundra; the tribe of Red Indians in Savana and Nigroes in African forests. **Demolins** finely explained environmental determinism. He said that rearing of animals is the main source of livelihood of the tribe in grassland. They mainly reared horses which benefitted them in several ways. Horses were used as source of food as well as means of transportation. It gave them speed, resulting in the expansion of their areas of activity, unbroken family relationships and religious unity. Speed had sometimes helped them to develop heroes like Chinggis Khaan. In such a tribe, the male grows more powerful than the female. Thus patriarchal society emerged as their main characteristic.

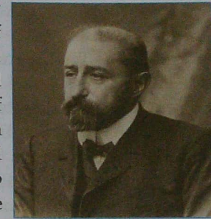


Fig. 8.4 Edmond Demolins

Victor Cousin declared that if he was given a topographical map of a land, he could tell the general character of its inhabitants, their role in history, etc. by analysing the topography (Febvre 1922).

8.1.6 Darwin Phase :

Darwinian theory brought about a revolutionary change in deterministic philosophy. Before this, deterministic events were **teleologically** explained. These events now could be scientifically analyzed with the help of Darwinian theory. Determinism was deeply influenced by Darwin from the middle of the nineteenth century. There are three main aspects in Darwin's theory –

- (i) **Evolution or change with time:** with the passage of time living beings change from simple to complex;
- (ii) **Natural selection and struggle:** only the fittest and strongest can survive in a competition;
- (iii) **Association and Organism:** man is a part of ecology.

Charles Darwin's first law (*Evolution or change with time*) is remarkably applied by William Morris Davis of America in 1899, in his cycle of erosion (Vale, 2002). Evolution of communities is also explained applying Darwin's first law.

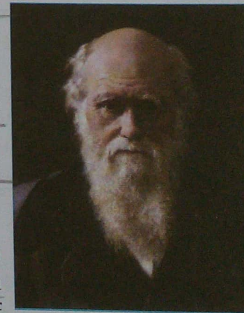


Fig. 8.5 Charles Darwin

In 1869, **Haeckel** made use of Darwin's third theory of '*association and organism*' to construct his theory of ecology.

Darwin's second theory of '*natural selection and struggle*' efficiently applied by the British scientist, **Herbert Spencer** (1820-1903), to formulate his own theory, known as **Social Darwinism**. Application of Darwinian theories for the explanation of economic and political events is known as **Social Darwinism**. Spencer believes that there are great similarities between man and other animals. Other animals have to struggle with their environment for survival, similarly, man is also required to evolve, being guided by his culture and civilization.

Henry Buckle was the main propounder of environmentalism. In his '*History of*

Civilization in England published in two volumes in 1857 and 1861, he said that the main reason behind the rise of city civilizations in Africa and Asia is fertile land, but in Europe climate is the main reason. The ability of physical work depends upon climate. Excessive warmth works to make races less hardy, temperate climate is the best for making the hardiest races. Short summer and long winter affect physical powers adversely and make races indisciplined, which results in unsystematic and untidy performance of all works. In the same way, climate and wages can be linked. According to **Buckle**, Indian climate and fertile land have jointly worked to create dense population which has resulted in low wages. Apart from this, he also opined that inequality in the distribution of wealth produces inequality of power (on society). Races living in India, Mexico, Peru, Egypt, etc. where environment is more dominant are more prone to religious superstitions.

Friedrich Ratzel (1844-1904), the exponent of systematic geography, was deeply influenced by Darwinism. He is mainly called the **introducer of the concept of new determinism**. He put an end to classical determinism to bring in Social Darwinism. In

Germany his book '*Anthropogeography*', he considered the socio-cultural characteristics to be the result of the natural environment of a region. '*Anthropogeography*' published in 1882, mainly discussed the reasons for population distribution of places. The second volume of it, brought out in 1891, discussed not only population distribution, but also shapes of habitation, emigration, diffusion of culture, etc. **Dickinson** (1969) proposed that similar geographical locations offer similar types of scope for the development of the ways of life. In support of his proposition he said that both England and Japan are surrounded by seas on all sides, which has protected them from foreign invasion, a precondition for greater development. So he postulated that geographical position of a region plays an important role in the degree of its development. Practical experiences of **Ratzel** brought him the lesson that geographical location and physical features are inseparably connected with human history, ways of life and stages of development.

Ratzel applied Darwin's concept of *struggle* and *selection* in his **Political Geography** resulting in the creation of a new branch of geographical study. Ratzel put forward the concept of '*lebensraum*' in 1896 concerning the spatial growth of a land. He said – "*Just as the struggle for existence in plants, animal world always centres around a matter of space, so the conflicts of nations are in great part only struggles for territory.*"

"**Politische Geographie**" another famous book, published by Ratzel in 1897, clearly reflects the idea of determinism. Here he considered a state an '*organic whole*' constantly striving for expanding its control over larger areas for the benefit of its countrymen. Such a space is called by Ratzel, a *lebensraum* or living space. In this book the author gives scientific explanation of political behaviour of countries. He said that evolution and growth of any particular state, during a particular period and space depends upon the activities of natural environment.

According to the Russian historian, **Sergey Soloveyv**, the nature of a state has notable influence on its history. **Vasily Klyuchevsky** made a survey on the influences of woods, steppe grassland and rivers on Russians. He concluded that all of these things exert individual influence on Russian people; still Russian scholars refused to accept absolute determinism.

8.1.7 Twentieth Century:

In 20th century determinism grew in various format.

8.1.7.1 Environmental Determinism :

Determinism in the 20th century were so popular, that almost all the geographers started to follow this philosophy. Thus determinism emerged as a strong and distinct paradigm. In 1902, **William Morris Davis** popularised 'ontography' which is nothing but a variation of Darwin's theory of 'natural selection and struggle'. The theory of ontography found its ardent and staunch supporter in the first half of the 20th century in **Ellen Churchill Sempel** (1863-1932), an American geographer, who was also influenced by both Darwin and Ratzel. In her book "Influence of Geographic Environment" published in 1911, the author publicized Ratzel's ideas, found in "Anthropogeography", in English speaking nations. Besides this, she popularized environmentalism in America through her book "American History and its geographic conditions" in 1905.

In the very opening paragraph of "Influence of Geographic Environment", E.C. Semple considered human beings to be the creations of nature. She says, "Man is a product of the earth's surface. This indicates that he is not merely a child of the earth, dust of her dust, but that earth has mothered him, fed him, set him tasks, directed his thoughts, confronted him with difficulties that have strengthened his body and sharpened his wits." - E.C. Semple (1911)

Mountain regions have helped their inhabitants to develop stronger muscles of legs. Legs of the people in coastal areas are less strong but they have stronger arms and powerful chest muscles. She has also analysed behavioural differences of different communities living in different geographical regions. She said that hill communities are over-conservative because of underdeveloped communication system in the region. They do not want to change their habits. They are hostile to new inventions and discoveries. They intend to stick to their old customs and practices. As a result, they are orthodox and suspicious in nature. They are highly sensitive to their own culture and against any criticism by outsiders. They have a strong faith in religion and feel a strong bond for their family. Struggle with environment has made them honest, economical, hardy and prudent.

On the contrary, north Europeans living in plains are lively, thoughtful, restraint, less emotional and observant. South Europeans, living in the temperate mediterranean regions, are jolly, imaginative and open minded. Negroes living in equatorial regions are affected by natural hostilities. German tribe with golden hair is a branch of Europeans living in the Mediterranean region. But the mediterraneans have black hair and dark skin. Climate, especially the difference in temperature, is responsible for this. Natural environment is the principal reason behind the differences between the peoples belonging to the same community.

From Sempel's time, the concept of determinism became popular as **environmental determinism**. In the pre-Darwinian Era the concept of determinism was teleologically explained. God was considered to be the controller of human societies while keeping himself hidden behind environment. But after the publication of Darwin's "On the Origin of Species" (1859) determinism began to be scientifically explained. The term 'environmental determinism' has its source in this new concept.

Russian geographers also studied determinism. **L. Mechnikov** opined that human society was greatly influenced by rivers. He also thought that man played an important role to create a geographical environment surrounding him. **N. Baranskiy** said in 1926, that natural environment is used as an element for production. So the relation of production or class struggle is controlled by environment, which eventually affects social relations as well as builds the entire social system. But in 1938, **Stalin** said that environment cannot have complete control over social structure, though it can either increase or slow down the pace of development. **Plekhanov** in 1956, supported Baranskiy's view as he proposed that environment controls the elements of production and these elements of production influence class struggle, which eventually influence social structure and thus social life is controlled by environment (Fig. 8.6).

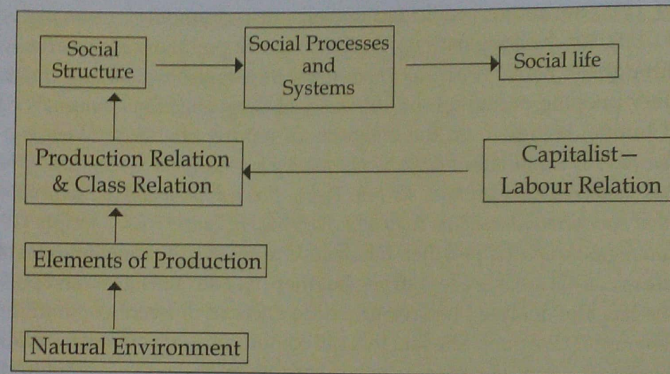


Fig. 8.6 Impact of Natural Environment on Social systems (After Plekhanov, 1956)

Social, cultural and economic activities of Indonesia are so much influenced by the volcanoes that it may be cited as an example of environmental determinism. **Marshall** pointed out the extent and intensity of this influence—“you might say that in Indonesia, volcanoes are a cultural cauldron in which mysticism, modern life, Islam and other religions mix – or don't. Indonesia, an assemblage of races, religions and tongues, is riveted together by volcanoes. Reverence for them is virtually a national trait!” (Marshall, 2008).

Human culture, tradition and practices are closely linked with nature and climate. **Hardin** (2009) cited example from 'Judaism' derived from agricultural seasons found in ancient Judea. The religious year began with *pesach* on 15th day of Jewish month that coincides with (March- April) and involved 'rites related to spring preparation and planting'. The second festival is *shavont* to celebrate the harvest of the first fruits. The third is the *skit* to celebrate final harvest of the year and wandering of the Jews in desert. So seasonal climate and related agriculture played important role in shaping culture and practices in Judaism.

In India, several festivals are related to climate and crop calendar. **Pongal**(Tamilnadu), **Onam** (Kerala), **Bihu** (Assam & NE India), **Nabanna** (West Bengal), **Lohri** (Panjab and North India) are the harvest festivals. Again **Bihu** is celebrated in three different harvest

seasons (Spring, Autumn and Winter). During **Onam**, King Mahabali is worshiped; people decorate elephants and take out processions. Long boat races in the backwater of Kerala are held during **Onam**. People light 'bonfire' and celebrate with corn and sugarcane in **Lohri**. Thus climatic seasons and associated crop calendars have a direct influence on our culture, practices and tradition.

8.1.7.2 Climatic Determination:

E.G. Dexter (1868-1918) conducted researches on climatic influences in 1904. Researchers of the following years were influenced by his works. Dexter himself believed in climatic determinism. He collected information about daily temperature, humidity, luminosity of the sun, wind system, etc. at New York, Colorado and Denver and simultaneously conducted perception survey on human behaviour. The findings of this research showed significant relationship between climate and human behaviour relating to criminal activities, suicidal tendency, and attitudes.

Ellsworth Huntington (1876-1947) was a supporter of climatic determinism. He opined that the Mongols moved from the grasslands of the Middle-East to India, China and east European countries because of droughts. He had opined that there was a time when the climate of the Middle-East became dry, grass became scarce then. In their struggle against droughts, the Mongols spread in the neighbouring greener areas. He expressed this view in 1907, in a book entitled "*The Pulse of Asia*."

In his book "*Civilization and Climate*" published in 1915, he considered that development and climate are interrelated. He proposed that utmost development of city civilization depends upon a certain state of climate, and which is variable enough. He also opined that people are most healthy and intelligent in areas where the average temperature is nearly 20°C. This kind of climate is there in north-east America and north-west Europe. In fact, these two areas are highly developed in fields of science and technology. This Temperate Zone is dominated by cyclonic wind. Weather is not monotonous and so ideal for the growth and development of human intellect. Tropical climate, on the contrary, is moist and hot, which makes people lazy, negligent to work, introvert and suspicious in nature. So they are destined to be backward. Monotonous and moist equatorial climate is also unfavourable to development.

Huntington divided the whole earth into two climatic zones – harsh and mild. He said that ancient civilizations, like Indus, Chinese, Egyptian and Mesopotamian were found in mild zones and on fertile lands. He opined that his own motherland is placed in the best climatic region of north-eastern America. He also drew a map with the help of some Americans and Europeans. There he showed that people living in temperate zones are most healthy, lively and civilized. Although this work of his, like Aristotle's, is charged with partiality.

The concept of climatic determinism is also suggested in Huntington's book "*The*

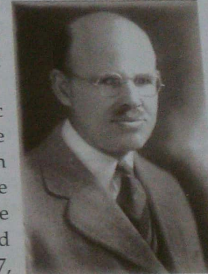


Fig. 8.7 Ellsworth
Huntington
(1876-1947)

Principles of Human Geography," published in 1921. In *"Mainsprings of Civilisation"* his last and final book, published in 1945, he considered climate and food habit equally responsible for efficiency of communities or races.

Albert Perry Brigham, a contemporary of W.M. Davis was a supporter of climatic determinism. In 1903, he brought out a book entitled *"Geographic Influence in American History"*. Here he said that geographers should thoroughly investigate the influences of natural forces before formulating a general theory. He even criticised the general theory based on only climate. He believed that many other factors work together with climate. So a generalised view based on only climate may be a wrong judgement. He was critical to the theory of climatic determinism where climate is considered to be the determining factor behind racial characteristics, complexion, etc. **Prompt** (1967) published a range of research articles based on the research outcome of Biometeorological Research Centre (Leiden, Netherland) on climatic influences on human activity (Chappel, 1989). **Diamond** (2005) put a strong argument in favour of climatic determinism. He mentioned that Spanish Armada, the then superior navy, was largely defeated due to a climatic event. This has altered the European history. Gradually Britain has emerged as the superpower replacing Spain. Diamond concluded that *"In the big picture, such natural phenomena have been constant agents of change"* (Diamond, 2005 adopted from Hardin, 2009).

Impact of **mediaeval warming** during mid 8th century to later half of 13th century and associated drought on human civilization and human history is well documented. Europe was warmed and rainfall increased whereas other parts were dry. Those widespread drought forced Mongols to migrate out of Asian Steppes to invade Europe, South-West Asia and China, having long penetrating impacts on human history. This drought was responsible for abandonment of 'Mayan cities' and 'Anasazi culture' of United States. As a consequence of this warming, 'Black plague' started in 1347 that eventually killed nearly half population of Europe (Fagan, 2008). Not only the warming but also sharp decrease in temperature during little ice age made enormous change in human history. This freezing conditions permitted citizens of Manhattan to walk across the Hudson river to Weehawken (Fagan, 2008). **Fagan** (2008) argued that *"such singular events were just a few of the examples that expressed a simple fact : the natural environment was and had always been an essential underlying element within which human activities unfolded."*

8.1.7.3 Politics and Determinism :

Sir Halford J. Mackinder was influenced by Darwinism and tried to establish that World political history and distribution of power largely guided by geographic characters specially natural environment, distribution of land and sea. Using the theory of *selection and struggle* in his first book *"The Geographical Pivot of History"* (1904), he established that the Pivot region is naturally protected on all sides having a narrow corridor between the Ural and the Caspian Sea. The Pivot region can be easily accessed only through the Steppes-corridor. Camels and horses were used as means of easy conveyance. His next book *"Democratic Ideals and Reality"* published in 1919 speaks of **Heartland**, the geographical location of which is of such a nature that has the potentiality to command the world.

8.1.7.4 Physiological Determination :

Karl Mackey showed by his research the influence of soil and natural vegetation on health and body structure. He presented the example of the Shetland island at the extreme north of the British Islands. World's shortest horse, only three feet high, is found here. It was considered to be a special species, which were transported to the U.S.A. for some commercial purpose. There its descendents gradually grew higher and higher, till they attained the standard height, which proved that they did not belong to a special species; and their dwarfism was caused by their original environment. The same argument holds good for the Chinese, as well as for the Japanese people who grow both in height and weight, if they live in Europe or America from their early childhood. African Pigmies, when shifted to plains where foodgrains are plenty and cattle are raised, grow taller and stronger.

P. Geddes tried to prove that greater number of people are affected by malaria, if they suffer from malnutrition. He observed that the Indian mohamedans who are mainly non-vegetarians are less affected by malaria than their fellow Hindu countrymen taking vegetarian diet.

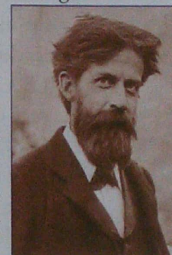


Fig. 8.8 P. Geddes

Birth rate has a direct relation with the habit of taking animal protein. It is recorded to be lower in countries where average protein intake is higher. (Table. 8.1).

Table 8.1: Relation between Protein Intake and Birth Rate

Climatic Zone	Country	Rate of protein intake (gm/person/day)	Birth Rate
Temperate climate	Sweden	63	15
	Denmark	60	18
Tropical climate	Malayasia	8	33
	India	7	35

Standard of living and socio-economic conditions are directly related to birth rate. So it may be said that socio-economic condition is indirectly related to food habit.

Nobel prize winner **Lord Boyd Orr** and **Gilkhs** jointly studied two East African communities, namely Mesai and Kisku and found the difference in protein intake. This is so because the Mesai are herdsmen and intake more protein and the Kisku are farmers so they are vegetarian. As a result of it they are physically different, though living in the same natural surrounding. (Lord Boyd Orr 1950) This is why the people of Bangladesh, Somalia, Nepal, and Vietnam are weak in health.

Mac Carrison, presented the example of the people of Punjab and of South India; the former are non-vegetarian and stronger than the latter who take only vegetarian diet (Castro 1952). Protein content in the diet of Meghalyans is so low that the people belonging to the tribe of Khasi are suffering from ill health and asthma. Connection between environmental determination of skin colour 'gained scientific weight' after realizing that there was a direct long-term connection between skin colour and relative intensity of sunlight. There are several attempts for explaining complexion through

'Eurocentric-racism' (Diamond, 1999). Recent study of Jablonski (2004) showed that darker pigmentation is the better protector of skins from stronger ultraviolet (UV) light prevalent in tropical latitudes. Natural selection during evolutionary process favoured the individuals in tropics to cope with the environment of stronger UV light having dark complexion. Boughey (1971) found that not only in skin, this pigmented cells (melanin) also naturally occur in bile, blood, urine, eyes and hair. According to the environmental condition the melanin cells in the skin have their major impact.

In high altitudes of the Andes Mountain of South America, the indigenous people have evolved through unique physiological adaptation to high altitude environment. They have larger lungs and shorter and stronger thighs than those living in lowland. These unique traits are carried forward through generations by 'genetic drift' and some times called as race (Fellmann *et al.* 2007). Similar unique adaptations may also be noticed for 'isolated population' through in-breeding. Historical evidences may be cited in favour of powerful roles of environment in human activities. Norse exploration on warm northern sea in open boats (10th century AD) was possible during Great drought. Fagan, (2008) cited example of warm phase in Europe during 800-1200 A.D. and its impact on production system and society. Physical sciences employ principle of determinism to explain cause-effect relationship. Geographers try to investigate the intricate relationship between human and the environment and in other sciences as a whole, new terms and concepts are proposed to describe those intricacies (Hardin, 2009).

Brandt report (1991) prepared by a commission appointed by United Nations inferred that—"bulk of the less developed countries were located in lower latitudes (Fellmann *et al.*, 2007). This report clearly suggests that there is a distinct pattern in spatial distribution of development determined by latitudes and climate. The Brandt Report hints at one frequent but simplistic spatial explanation. Development is a characteristic of the rich north and mid latitudes. More precisely—poverty and underdevelopment are tropical conditions. Proponents of the latitudinal explanation support their conviction by noting that rich countries—some thirty in number, have 93% of their population residing in temperate or snow belt zone; forty two of the world's poorest states have 56% of their people in tropical latitudes and 18% in arid zones (Fellmann *et al.*, 2007).

This conclusions regarding people and poverty as a function of latitude is quite misleading and too much generalised (Fellman *et al.* 2007). There are also examples like N. Korea, Afganistan, Bangladesh, Myanmar, area of east Europe, Balkans and Caucasus are the poor states occupying regions of reportedly prosperous latitudes. Several low latitude countries are also developed. One might go into details of the causative factors before making any conclusion on development determinants.

In spite of this limitation, high rate of chemical weathering and associated leaching, speedy decomposition of organic matter make the soil infertile that is responsible for marginal farming practice at tropical region. Hot and humid climate tends to suppress human activity. These two factors together developed the cultures characterised by poverty and lethargy. (Fellman *et al.*, 2007)

8.3 CRITICISM OF DETERMINISM

Social Darwinism was criticised in America, especially by humanistic geographers. It was rejected by most historians, social scientists and others. Many geographers accept Brigham's view to reject the extreme environmental determinism. In fact, different tribes or communities are found to be living in regions with almost same climate and geographical condition. Such as, in the state of Jammu-Kashmir the community of *Kashmerians* are farmers while *Bakerwals* are nomads, the community of *Nepalese* and *Khasi* of Meghalaya, the Assamese and the Bengalees of the plains of Brahmaputra, the Eskimos and the Laps of the Tundra region, the Pigmies and the Negros of Middle-Africa are different in respect of physical appearance, food habit, learning, attitude to life, etc. No two communities or anthropological groups use natural resources exactly in the same way, though living in the same environment. They differ due to their differences in respective progress, learning, skill etc. So they have different life style and approaches.

Environmental determinism was criticised in America, Britain, Canada and many other countries in the Post-World War II period. It was heavily criticised for its unnecessary emphasis on environment, unidimensional approach, etc. (Kimble 1938, Cahanman 1948, English, 1968). **Spate** said that it is not worthwhile to consider nature excepting human being. He was in favour of a discussion based on interaction between environment and human being.

Determinism is assailed for the following reasons:

- (i) Determinism unreasonably attempts to generalize the complex interrelationship between man and nature.
- (ii) Human culture finds no importance in environmental determinism.
- (iii) Environmental determinism is unable to explain different human activities in similar natural surroundings.
- (iv) There are many instances of man and nature influencing each other.
- (v) Man and nature interrelationship should not be viewed from the point of environment only. The right approach should be the assessment of natural influences on human psyche, physique and social structure of communities.
- (vi) **Hartshorne** (1959) opines that determinism considers man and nature as two separate identities, but man is an integral part of environment.

According to **Hartshorne** (1966), "*The earth features are neither purely human nor purely natural, but composite in character.*"

By the end of the 1930s, most geographers had dismissed environmental determinism as a dead end investigation too mechanistic to be useful in the study of human behaviour (Hardin, 2009).

Freeman (1969), addressed these two extremes of plural methodologies, within the discipline of geography. "*The other hand, there are people (who are) dazzled by the endless hopes of human conquest of adverse and difficult environments and on the other hand, there are those who find everything pre-determined by physical factors beyond human control*" (quoted in Beck, 1985).