# DARWIN’S IMPACT ON GEOGRAPHY

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<td>Darwin, Origin of Species, Geography</td>
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DARWIN’S IMPACT ON GEOGRAPHY  
Taruna Bansal

Introduction:
Darwin’s evolutionary theory had a formative influence on geographical thinking during the late nineteenth and early twentieth centuries (Livingstone, 1992). Yet when most of the sciences were re-examining the impact of biological thinking and particularly of Darwin's work on their methodology and philosophical as well as theoretical foundations geographers were silent. The result was that the Darwin centenary passed almost unremarked in the geographical academia. The strangest part being that even in Hartshorne’s work he makes a passing reference to Darwin while discussing the impact of life sciences on geography. This is basically because due importance was not given to Darwin when the death centenaries of the deaths of Humboldt and Ritter were commemorated in 1959; the publication of Darwin’s book *On the Origin of Species* was completely ignored by the geographers even though it was published in the same year. But as already stated his work either explicitly or implicitly has influenced and inspired geographical work in the last hundred years.

While analyzing Darwin's theory it is important to understand that his theory is much more than simply, one dealing with 'evolution'. The word was popularised by Herbert Spencer in the nineteenth century. Darwin introduces this word in the sixth edition of the *Origin of Species* and then uses it cautiously. It was rarely applied to social and cultural phenomenon until the 1870s when scholars started analyzing language, law or society with regard to their evolutionary processes. Rather it was Spencer who made this term popular among the social scientists after the publication of his *Study of Sociology* in 1873. After this, the term became so common that a number of classical approaches in the field of social sciences has been described as “evolutionary”. Examples can be cited in the writings of renowned scholars like Adam Smith, Karl Marx, Veblen, Schumpeter to name a few. Though their approach was very different from each other the baseline or the crux was somewhat same as they all talk with relation to the phenomenon of social change (Hodgson, 2009).

When concerned with Darwin’s impact on Geography as a discipline it needs to be understood that Darwinism in this discipline has been primarily interpreted in terms of
‘evolution’ in a sense of a continuous process of change that occurs in a temporal framework and brings about changes that are spatially visible. Here the discipline is at par with other science that too interpreted Darwinism in the same mould. Therefore, it would not be wrong to say that Darwin was primarily concerned with the mechanism of change or, as The Origin was subtitled, "the preservation of favoured races in the struggle for life". This element that brings forward the concept of struggle was applied particularly in human geography under the paradigm of determinism. This gave new impetus to concepts of biological origin in geography (what Ritter was talking about) leading to the development of ecology which brought new insights in some of the branches of geographical thought.

Stoddart, in his article Darwin’s Impact on Geography published in 1966 in Annals of American Geographers (AAG), Vol 56, takes four themes into consideration which is of great importance in geographical thought. He opines that Darwin’s impact can be best understood if one takes these four themes into deliberations that undergo in the theoretical framework of geography. The themes are:

1) the idea of change through time;
2) the idea of organization;
3) the idea of struggle and selection;
4) the randomness or chance character of variations in nature.

All these four themes have been vehemently examined from the geographical point of view, to understand what actually Darwin wanted to say in each one of the themes and how geographers reacted to these views to include them under the geographical domain.

1) **Time and evolution:**

Lyell’s *Principles of Geology* brought a paradigm shift in physical geography and this shift can be regarded as similar to the revolution brought by Copernicus on his idea of Earth’s position in the universe. As this paradigm changed the medieval view on the age of the Earth, Lyell’s work also revised the way landforms were studied. As a result, the expansion of physical geography in the latter half of the nineteenth century saw a significant transformation. But the works from Hutton to Lyell were not the only cause; Darwin’s theory of the transformation of fringing reefs - barrier reefs – atolls over time by slow subsidence was another factor to bring this change. This brought ‘cyclic” ideas in
geomorphology which was later expanded by Huxley in his book *Physiography* which got published in the 1870s. But the one who got most influenced by Darwin was William Morris Davis who took evolution as his inspiration in his idea of the geographical cycle. In his paper on the development of landforms (1884) he refers to a “cycle of life”, and explains this through birth, youth, adolescence, maturity, old age, second childhood, infantile features and further emphasizes on the analogy of an organism that undergoes a sequence of changes in its form over a period of time. It was after 1900 that Davis started putting more emphasis on orderliness and development through a time where he uses the term evolution. His work was so popular that it brought a revolutionary change not only in the studies of landforms or denudation chronology but an entire field of geomorphology.

Interestingly, Darwin himself was influenced by Lyell's principle of uniformitarianism although research shows that if a strict uniformitarianism occurs than there is no place for progression or transmutation of species. Huxley (1887) too saw that consistent uniformitarianism postulates evolution as much in the organic as in the inorganic world and that the *Origin of Species* is the logical sequence of the *Principles of Geology*.

When in 1899, Davis wrote his paper on *Cycle of erosion*, he singled out time as the most important factor although he talks of three factors – structure, process and time. The cyclic approach in geomorphology is based on the fact that there is a systematic irreversible change of form through time. This became the basis of the analogy of aging which further strengthened the Davis-Johnson School.

Similar views have also been noticed in plant geography especially in ecology in the works of scholars like Hooker, Tansley, and Clements. In soil science, evolution as change through time was adopted by scientists like Marbut, Dokuchaiev and Sibirtsev. In human geography to change through time has been a dominant theme. Such ideas are seen in Geddes work on cities, Taylor’s study of race and culture and Beaver’s interpretation of economic landscape. Apart from these noteworthy works this theme has been most common in the works of Berkeley School in their study of American settlements.

These evolutionary ideas in geography led to time-frameworks which subsequently refined the interpretations in the light of biological revolution – change through time. In Stoddart’s (1966) view, ‘what for Darwin was a process became for Davis and others a
2) **Organization and Ecology:**

The second major idea of Darwin that highly influenced Geography as a discipline was the idea of inter-relationships between all the living things and its environment be it physical or socio-cultural. This became the major theme in ecology, while Clements was working in the framework of evolution and time in America; the European scholars started working in the light of structures and functions. This became popular as Tansley’s concept of ecosystem. One can indeed say that Darwin’s most important contribution in the field of ecology was that he included a man in the living nature of the world. For example, Huxley’s work *Man's Place in Nature* (1863) deals with man’s relationship with the environment and not with his ecological status. In 1869, Haeckel used the term ‘ecology’ and thereafter the concept of human ecology was used to study the relationship between man and his environment. Park (1936) further elaborates on this concept when he discusses the scope of human ecology. For him, human ecology explores the processes involved in maintaining the biotic balance; where man interacts with his environment through his culture and developments and innovations in technology. Similar views are seen in McKenzie’s (1924) work but with an economic tilt.

The most influential work on this theme was that of H.H. Barrows who in his Presidential address to the Association of American Geographers in 1923 described “*Geography as the science of human ecology*”. He made it clear that Geography as a science should focus on relationships existing between natural environments and the distribution and activities of man. Though this approach was not widely accepted by American scholars, the Berkeley School adopted the ecological approach in the study of settlements.

In geography, as a discipline, the organism analogy operated on three distinct levels: the earth, its regions, and its states; and on each level the use of this theme predates Darwinism; the most exemplary example being Hobbes Organic theory of the State. Even in the discipline itself, the idea of the organic unity of the earth can be traced in the works of Ritter who believed that all the parts of the Earth were connected in a similar way like the body is connected to the soul. Both Humboldt and Ritter talk in term of organic analogy and in later part Blache reached similar conclusions both at the world and regional levels.
Herbertson (1905) too in his work on regional geography uses the term "macro-organism" for the "complex entity" of physical and organic elements of the earth’s surface. He defines natural regions as definite associations of inorganic and living matter with definite structures and functions, with as real a form and possessing as regular and orderly changes as those of a plant or an animal.

In political geography, this theme is mainly associated with the work of Ratzel. In the first chapter of his Politische Geographie which is entitled as "Der Staat als bodenstandiger Organismushe” outlines that the organic quality of the state is dependent on the organization and interdependence of its parts.

The fundamental principle of geographers for using the organic analogy is based upon the notion that the components of the organization are not only related functionally but are also mutually inter-dependent in such a manner that there is a continuous flow of matter and energy in a state of equilibrium; resulting in the formation of a unit as a whole.

The major disagreement to this theme is methodological in nature. The critiques opine that it is a synthetic approach which does not assist the actual investigation. Moreover, it is idiographic in nature and does not fit in the discipline as Geography is more of a nomothetic science. Thus the approach has lost its relevance is occasionally mentioned with respect to works of Herbertson and Vidal de la Blache.

3) Selection and Struggle:
Most of the writers in the pre-Darwinian period discussed the man-environment relationship as a cause-effect relationship. They did not ponder into the processes involved in this relationship. Ratzel for the first time took up this issue in the first volume of Anthropogeographie (1882) which was later developed by his students Semple and Demolins. In France, Blache’s ideas dominated so this rigid framework of harmony and relationship was not accepted. But in America, this was carried out by Davis who tried to incorporate this idea of causality into the definition of geography itself. This notion was not accepted by many scholars as they were of opinion that no science can be confined to the study of a specific relationship. Moreover, this causal relationship provides an unsound methodological approach as the intensity of the influence of environment becomes a major problem.
Fluere was deeply influenced by Darwinism and opined that the man-environment relationship should be studied from the physiological point of view and while delineating human regions; he applies Darwin’s ideas of natural selection through environmental influence to human groups. Huntington too looked into this theme and applied it to human population while studying it at the global level. Taylor investigated this idea in his studies on race, population, states, and cities. He concluded that these are directly influenced by environmental factors as their development over time is regulated by these conditions. Determinists, therefore, raised certain questions but could not possibly find suitable answers within the geographical framework. Hartshorne tries to seek answers by stating that the whole determinist-possibilist debate within the discipline was unreal and futile which led the whole debate on a philosophical level rather than at an empirical level.

In America, the concepts of Spencer and Darwin, the survival of the fittest and the struggle for life, respectively were positively used in the disciplines of political science and economics to justify laissez-faire. Darwinism, though, had a limited influence on the classical equilibrium economics.

In geography, particularly, political geography, these ideas of struggle and selection were used significantly. Ratzel (1896) applied this concept to his seven laws for the growth of state which later developed as the concept of Lebensraum. He states that as plants and animals struggle for their existence, a nation too, clash for their struggle to capture more territory. The organic analogy derived by Ratzel along with the theme of struggle and selection provided a strong model in analytical political geography which had scientific justification in man’s political behaviour. Semple tried to omit the concept of organic analogy in her writings but it seemed that she was still touched by it, as these themes penetrated in her writings.

Kjellen (1942) in his work on states was highly influenced by Ratzelian ideas. His Geopolitik is an example where he writes that states are biological manifestations not only morally but also organically as they experience lust. He was also supportive of Spencer’s writings which are visible in his Staten sam Lifsfarm (1944). The over-dependence of political geography on the organic analogy, the ideas of struggle and Lebensraum brought disgrace to this branch, especially in the 1930s. In the words of Troll (1949), political geography is trying its best to disassociate itself from this theme so that it can look further.
4. Randomness and Chance:
Darwinism in geography has always been interpreted either in terms of change through time or with regard to social struggle and selection. Whatever the case may be the interpretation had a tilt towards determinism. This leads to a central question that if one studies the biological impact on geography than he/she has to answer a question pertaining to the philosophical inclination of this particular doctrine towards determinism and not probabilism. Secondly, why chance has been deducted from geographical writings especially when throughout history, geographers have tried to seek answers in relation to change. As Merz (1928) opines that the study of chance is one of the greatest scientific achievements both in theory as well as in practice. Therefore, geography was thrown at a back foot in this field.

Laplace laid the base of probability in natural sciences in the beginning of the twentieth century. This was further strengthened by Quetelet and Buckle. In most of the scientific studies of that time, the tilt was towards chance as is visible in the works of Herapath, Clausius, Maxwell, Galton, Pearson, Fisher and Haldane. Then why all the geographical interpretations were deterministic. Interestingly some part of the answer is with Darwin only. The concept of chance was somewhat even ignored by Darwin as the word ‘random’ was hardly used by him in his writings. He virtually discarded the core theme of randomness and concentrated on selection.

To wrap up, one can say that Darwin did not bring anything new rather he had put old wine in a new bottle. Evolution as a concept was not new, only his way of looking at it was new. In geography, Darwinism became so popular because it acted as a unifying principle to bring all the components together, which was otherwise disconnected.

Conclusions:
During the past century, it has been noted that the biological influences in geography mainly descended from the theme of evolution or Darwinism. The themes - change through time, selection and struggle and interrelatedness of things (the organic analogy which later took shape of ecology) were all discussed by Darwin in *The Origin of Species*; in the eleventh, fourth and third chapters respectively. Geographers have used these themes in large proportions to discuss and interpret the geographical phenomenon. But when one talks of
random variation, the scenario are different as scholars especially in the geographical academia have neglected it; although in recent times it has become popular.

The discussion further elaborates that in the past hundred or so years biological influences have directly cut across geographical understanding. These have been incorporated by scholars starting from Kant to Humboldt to Hartshorne and Hettner. But interestingly they could not overshadow the geographical thought as the latter had built a niche for itself by concentrating on the phenomenon of interdependence that existed between different components on the surface of the earth. Still one cannot ignore Darwin’s influence as he established a base that worked on scientific inquiry and did not rely on theology. In other words, his greatest contribution is that he made natural sciences more scientific and freed it from theological philosophy. This became apparent with the publication of *Essays and Reviews* by Temple in 1860 when theology disassociated itself from science and accepted that this field of knowledge was outside its periphery. Darwin also contributed by making science more empirical and inductive in nature; this dismisses the role of teleology also. The biggest contribution of Darwinism in geography is in establishing man’s place in nature and at the same time making a study of man a scientific learning.

To conclude one has to look at Stoddart’s (1966) opinion who states that Darwin himself made a clear-cut division between the way evolution was affected by others and the course of evolution; geography as a discipline ignored the former and embraced the latter. As a result, geography became highly inclined in understanding history and progressive change only with relation to ‘evolution’. Geographers in recent times, by and large, have not advocated this concept as they argue that factors like transport conditions, population growth or even disease ecology may be influenced by Darwinism but several other factors like geopolitics, cultural barriers are inherently geographical with a significant geographical dimension.