EARLY ORIGINS OF GEOGRAPHICAL THINKING WITH REFERENCE TO VARENIUS AND KANT

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THE RENAISSANCE AND THE BEGINNING OF SCIENTIFIC GEOGRAPHY

The Renaissance laid the foundation of scientific geography in the early 17th century. It was a period of voyages of explorations and, inventions that cleared several prevalent earlier geographical misconceptions through new information that flooded in. Hence, this was the beginning of the ‘pre-classical period’ of modern geography that continued through the 18th century as well. Several conceptual developments took place at this time. The most notable among them were the:

- **Laws of Motion** by a German astronomer, Johannes Kepler in 1618.
- Acceptance of Copernicus’ concept of a heliocentric universe by Galileo in 1623. He also tried to describe the universe in terms of mathematical laws in contrast to the teleological concept of Aristotle.
- **Law of Gravitation** by Isaac Newton in 1686.

“Kepler, Galileo and Newton sowed the seeds of scientific revolution that marked the beginning of specialization” (Tatham, 1967). However, a major problem faced by contemporary scholars was to relate specific pieces of information to general principles. Hence, this was also the period which gave rise to dualism and dichotomies in geography which are prevalent even today. At the same time there were some efforts to revive the tradition of Greek and Roman periods. This was very much evident in the works of Peter Apian, Sebastian Munster or Phillipp Cluver, all of whom maintained the concept of a geocentric universe.

- **Peter Apian** also supported the Aristotelian concept of the ekumene or the zone of habitability.
- **Sebastian Munster** known for his work ‘Cosmographia Universalis’ followed the classical Roman tradition of historical geography and totally excluded mathematical and physical geography in his work.
Phillipp Cluver who carried forward the same tradition as Munster, was the first German geographer to formulate universal geography and at the same time made significant contributions in regional geography in his work ‘Introduction in Universam Geographiam.’ He also made a distinction between geography and chorography.

The most significant contribution during this period was however made by Bernhard Varenius which influenced the discipline of geography for more than a century.

BERNHARD VARENIUS (1622-1650)

Born in 1622, near Hamburg in Germany, Bernhard Varenius studied philosophy, mathematics and physics at the University of Hamburg between 1640 and 1643. Thereafter, he moved to the University of Konigsberg to study medicine and then to Leiden for the same.

Varenius renewed the mathematical tradition in geography. In fact, he was so impressed with the mathematical works of Kepler, Galileo and Newton that he vehemently criticized those who reduced geography to a mere description of countries. He may be credited for pioneering several developments in the subject matter of geography:

- He was one of the first scholars to highlight on the differences in the nature and content of physical and human geography though he himself was not much interested in the latter. This was because human geography could not be subjected to mathematical laws to generate universal principles. He believed that the methods of the natural sciences could be successfully used to draw conclusions about natural phenomena with precision to a considerable extent. But they could not be applied to human groups as they were more subjected to probability than certainty. Varenius opined that generalisations regarding human groups should be restricted to a particular time and space.

- Using the terms of Bartholomew Keckermann a German philosopher, he partitioned geography into-
  - **Special geography** essentially concerned with the description of particular places on the basis of direct observations. This branch of geography was assumed to have great practical importance for governance and commerce.
✓ **General geography** based on universally applicable mathematical or astronomical laws.

Hence, Varenius’ contributions eventually gave rise to the dualisms and dichotomies between physical and human geography and, more importantly between regional (special) and systematic (universal) geography though he asserted that they were mutually interdependent branches of geography. He stressed that special geography provided the database based on which general geography could infer the general hypotheses and laws.

- Varenius was the first to describe the differences in the amount of insolation received at different latitudes on the earth and pointed out that the highest temperatures on the earth were recorded in the hot deserts of the tropical areas and not in the equatorial belt.
- He was also one of the first to explain the world’s wind systems. Varenius stated that the air masses close to the equator were heated up and thinned out to be replaced by cold and heavy air masses from the polar regions.

In 1649, Varenius wrote his first book, *Description Regni Laponiae et Siam* (Regional description of Japan and Siam). It was an outcome of his interaction with the Dutch traders engaged in international trade while residing at Amsterdam with an assignment of a private tutor. Amsterdam was then the commercial hub of Netherlands while Nagasaki in Japan was a Dutch trading post. The book comprised of five parts:

i. A description of Japan.
ii. A description of Siam (Thailand) being translated into Latin.
iii. A description of the religions of Japan.
iv. Some information on the religions of Africa.
v. A short essay on the governments dealing with places and people.

This was followed by another exclusive volume on the religions of Japan. However, Varenius’ most significant contribution was his book, *Geographia Generalis* (1650) which was one of the first attempt to combine three branches of geography—general (systematic), mathematical and physical—and, chorology (science of space). This book consisted of three parts:
i. The **absolute or terrestrial part** dealing with the shape and size of the earth as well as the physical geography of continents, seas and the atmosphere.

ii. The **relative or the cosmic part** describing the relation between the earth and other celestial bodies especially the sun and its effects on global climate.

iii. The **comparative part** focusing on the principles of navigation and the location of different places in relation to each other.

In the preface of Geographia Generalis, Varenius advocated that, the description of particular places should take into consideration the:

i. **Celestial conditions**—climate.

ii. **Terrestrial conditions**—relief, soil, vegetation and biotic life.

iii. **Human conditions**—population, settlement, trade, forms of government.

Varenius’ Geographia Generalis could have had a second volume but it could not be completed owing to his untimely and premature death in 1650. This book was translated into several editions in Latin.

Therefore, the main advancements in the field of geography in the 17th century may be summed up as:

❖ Discovery of new places.

❖ More precision in the art of map-making. Special mention in this regard may be made of **Gerardus Mercator** who developed his projection based on the true azimuth (bearing) of places on the earth’s surface that provided a great aid in navigation purposes.

❖ Development of general or systematic geography.

The period following Varenius had no conspicuous advancement in scientific geography for almost a century. However, there were some prominent scholars like:

❖ **John Ray** (1627-1705)—developed systematic study of botany and an empirical classification of plants. He asserted the fact that water running down the mountain slopes acted as an agent of transportation of earth materials.
John Strachey—in 1719, explained how landforms reflected the underlying structure.

Domenico Guglielmini—studied the laws of river flow.

GEOGRAPHY IN THE 18TH CENTURY

The 18th century witnessed a shift in interest for the natural sciences based on empirical knowledge that provided a more scientific description of the earth’s surface than ever before. It paved the way for several new advancements in geography.

Catastrophism as an explanation for landform evolution was replaced by the concept of ‘uniformitarianism’ propounded by the Scottish geologist, James Hutton (1726-1797). This concept stated that the geomorphic processes operating today also operated in the past and were responsible for the visible landforms on the earth’s surface. In 1786, the concept of ‘graded profile’ was developed by Louis Gabriel ‘Comte de Bant’ of France, which was a state of equilibrium between the velocities of the flowing water of a river and the load of alluvium carried by it.

The key geographical developments of this period were characterized by the:

- Rise of politico-statistical approach in geography.
- Rise of reine (pure) geography.
- Development of practical and scientific methods.
- Foundation of a philosophical base in geography.

Some of the prominent geographers of this period and their major contributions may be summarised as:

- Comte de Buffon’s ‘Historie naturelle generale et particuliere’ was a monumental work completed posthumously by La Cepede and published between 1749 and 1804. He based his work on the description of travelers and explorers from all over the world. But he followed a non-mathematical and inductive approach. Buffon identified man as an
agent of change on the earth’s surface and asserted on the need for forest conservation to maintain the temperature balance of the earth.

- **Johann Rheinhold Forster** and his son **Johann George Forster** pioneered a scientific and practical approach in geography. The father-son duo accompanied **Captain Cook** on his second voyage (1772-75) during which they carried out botanical observations that enabled them to offer generalizations accompanied with casual explanations. After returning, Rheinhold Forster published a report ‘**Observations Made During a Voyage Round the World**’ (1778) which comprised of six sections on—(i) the earth and its lands; (ii) water and oceans; (iii) atmosphere; (iv) areal differences; (v) vegetation and animals; and (vi) races of mankind. Forster may be regarded as the first methodological geographer of modern geography.

His son, George Forster was the first to identify the similarities between west European and west North American climate as well as the temperature patterns on the eastern and western parts of the continents at the same latitude.

The greatest advantage for the Forster duo was that they could collect information on their own and did not have to rely on the descriptions provided by others. Both of them were critical about the idea of climate influencing human life.

During the early part of the 18th century, geography had a utilitarian characteristic for describing historical events or governments. But with the constant inflow of new information and empirical knowledge, soon it was able to overcome its subordinate position to history and emerge as an independent and interdependent science. This marked the beginning of **reine geographie or pure geography.** in which, political units were replaced by natural or physical units to describe both **landerkunde** (land) and **statenkunde** (people).

The tradition of reine geography was mainly carried forward by the French geographer **Philippe Buache** and the German philosopher and geographer **Anton Friedrich Busching**.

- **Buache** in his book published in 1756, formulated the concept that the earth was divided into several river basins that were surrounded by continuous ranges of mountains. These mountains acted as drainage divide between two river basins and even continued
underneath the oceans as strings of islands or submerged sand banks. His view may be easily exemplified by the rivers of Europe.

- **Johann Cristophe Gatter** carried forward the views of Buache and identified river basins as natural regions.

- **Busching** was greatly influenced by the politico-statistical approach of his time and made extensive use of statistical materials in his famous ‘*Neue Erdbeschreibung*’ that was published in 1792. He used population density as a geographic element and may be credited for propounding the theory of economic interdependence between countries. He regarded water transportation as the cheapest mode of transport.

- **H.G.Hommeyer** abandoned political boundaries altogether and divided the earth’s surface into ‘terrains’ which were natural regions and mostly river basins.

- **Johann August Zeune** attempted to discover the interrelationship between human beings and the biotic life of an area. He sought to redefine the earth’s surface not only on the basis of relief but also climate and vegetation.

Scientific geography received a different orientation altogether from the philosophical standpoint provided by **Immanuel Kant**.

**IMMANUEL KANT (1724-1804)**

Born in 1724 at Konigsberg in East Prussia (Russia), Immanuel Kant was not only a great philosopher but also made immense contribution in the fields of astronomy, geology and geography. But unlike Forster, Kant was more of an ‘armchair geographer’ because his interest in geography was not based on the actual observations in different parts of the world. Kant’s greatest contribution was that, he laid the philosophical foundation of the discipline of geography by defining its nature particularly in relation to the natural sciences.

Kant’s major interests were in the subjects of philosophy, mathematics and natural sciences. Like Varenius, Immanuel Kant also spent several years (1746-1755) as a private tutor with some affluent families of Konigsberg after finishing his studies from the University of
Kant was awarded with a Ph.D. degree in 1755, following which he was appointed a lecturer at the University of Konigsberg. Kant lectured with great proficiency not only in the fields of philosophy, mathematics, physics and mechanical sciences like mechanics, hydrostatics and hydrokinetics but also in military sciences like fortification and pyro-techniques. From 1756 to 1796, Kant offered a regular course of lectures on physical geography. According to him, the study of geography was an essential approach to the empirical knowledge needed for his philosophical investigations. However, finding the subject to be inadequately developed, he devoted himself in accumulating and organizing information from a multitude of sources. At the same time, he also tried to concentrate on specific geographical problems like, the deflection of winds due to earth’s rotation.

In 1770, at the age of 46 years, Kant became the professor of logic and metaphysics at the University of Konigsberg though earlier he was offered the same post at the universities of Erlangen and Jena. But he refused those offers as he was not willing to leave Konigsberg. He became a member of the Board of Governors in 1780 and in 1786, was assigned the chair of the vice-chancellor in the same university.

Kant’s early works like ‘General Natural history and the Theory of the Heavens’ (1755) did not have much to do with geography and was more related to speculative astronomy. It was the same, even with his treatises on earthquakes that dealt with the interior of the earth. However, geographical references were found in his later works such as ‘Critique of Pure Reason’ (1781) and ‘Critique of Judgement’ (1798). His essay, ‘Anthropology from Pragmatic Point of View’ (1798) also contained a vivid geographical description of the races and ethnic groups around the world. In his famous ‘Critique of Pure Reason’, Kant freed geography from its close bond with theology by rejecting the teleological concept. This put an end to the Aristotelian era in geography. He insisted that explanations for any phenomenon should be sought in chronologically antecedent events.

Kant believed that the geography of any place played a pivotal role in determining the progress of human civilization. So the physical geography which Kant developed was essentially ‘anthropocentric’ in nature and content. According to him, physical geography not only included the features visible on the earth’s surface created by natural processes but also by human actions. This viewpoint, Kant seemed to have conceived and borrowed from Buffon’s ‘Historie Naturelle.’ Later, this point of view was also adopted by Ritter. Kant opined that physical
geography was the first part of knowledge of the world and was essential to develop the basic understanding of the earth as the abode of humans and for furthering philosophical studies.

Empirical knowledge, according to him, could be obtained in two ways—either (i) through pure reason, or (ii) through the senses. Senses again could be divided into—(i) inner senses and, the (ii) outer senses. The world as perceived by the inner senses was the seele (soul) or mensch (man) while as perceived by the outer senses, was the Nature. While anthropology (used by him as analogous to modern term of Psychology) dealt with soul or man, physical geography dealt with Nature.

Kant advocated that knowledge could be classified in two ways:

- **Logical classification** that categorised items on the basis of morphological similarities and gave rise to systematic sciences like zoology concerned with animals; geology concerned with rocks or sociology concerned with social groups.

- **Physical classification** that categorised items as belonging to same time or space. With regard to this, he asserted that history differed from geography only in that, while the former was related to time, the latter was related to space. History studied phenomena that followed one another (*nachienander*) and had reference to time (*chronological*), whereas geography studied phenomena spread beside each other (*nebeneinander*) on space (*chorological*).

Since any individual’s experience was restricted to a specific time and space, his knowledge had to be supplemented with the experiences of others. Such knowledge derived indirectly from others could be divided into *two* types—(i) narrative or, (ii) descriptive. While history was narrative, geography was descriptive. Thus, history and geography made up the entire gamut of empirical knowledge—the former that of time and the latter that of space. To be more precise, empirical knowledge could be classified according to space and time.

When posed with the question that whether geography came first or history, Kant resolved the question by asserting that both, geography and history had existed in all periods. In fact, geography was a subset of history. So, if there had been an ancient history, there had also been an ancient geography which in turn explained the events of history. Physical geography,
concerned with Nature not only constituted the foundation of history but all plausible geographies.

Regarding the concept of ‘space’, Kant pointed out in his ‘Critique of Pure Reason’ that space was not something objective or real, neither it was any substance. It was something which was subjective and essentially a mental construct. It was governed by an unchanging law and provided a kind of framework for coordinating things and events all of which could be perceived with the outer senses.

Immanuel Kant may rightly be regarded as the ‘father of exceptionalism’ as he was opposed to generalisations and believed that history and geography were methodologically different from the other sciences as, they were concerned with the study of the unique and the ‘exceptional.’

Germany, in the 19th century witnessed the emergence of what may be described as ‘neo-Kantianism.’ Followers of this tradition sought to draw a line of difference between the historical and cultural sciences on one hand, and the natural sciences on the other. This was supposed to have sowed the seeds for another dualism in the discipline of geography. They upheld that whereas, natural sciences dealt with the objects that could be sensed externally and thus be explained, the cultural and historical sciences dealt with those objects that were mainly mental constructs and therefore, needed to be understood. Hence, while the former was concerned with the ‘nomothetic,’ the latter was concerned with the ‘idiographic.’

The dichotomy between the two approaches may be explicated as—the idiographic or empirical approach did not seek to develop laws but mainly focused on the description of particular places in the context of their lands, seas or places and attempted to find its relation with other places. The nomothetic or deductive approach on the other hand, sought to establish laws relevant for a location and made deductions based on those laws.

Apart from physical geography, Immanuel Kant may also be credited for pioneering several other branches of geography as well:

- **Mathematical geography** dealing with the shape, size, form and movements of the earth and, its position in the solar system.

- **Moral geography** describing the customs and traditions of humans in different places.
• **Political geography** which essentially studied the interrelationship between political units and their physical set up.

• **Commercial geography** which investigated as to why one country had abundance of some commodities but were deficient in others; a situation believed to have given rise to international trade.

• **Theological geography** which tried to analyse the changes theological principles experienced in different spatial units.

Kant was of the view that since physical geography described the natural composition of the earth and included almost everything on it---the atmosphere, mountains, rivers, oceans, humans, plants, animals----representation by cartographic means was not important and even if such maps existed, they should have only been used for pedagogical purposes.

Kant placed geography in a central position amongst the sciences which have been reiterated by geographers time and again. In human geography of modern times, the development of the ‘possibilistic approach’ of the French school and ‘humanistic geography’ may be attributed to the Kantianism.

The principles of Kant were systematically opposed and his philosophical basis of the subject was almost forgotten until it was revived by Hettner and Hartshorne. It is true that in present time, most of the disciplines have assumed an interdisciplinary character with one transcending into another. It is not possible any more to draw sharp and clear-cut divisions between the sciences as was done by Kant. But, in his period, most of the scholars of geography knowingly or unknowingly, followed Kant by giving ultimate importance to the influence of humans in describing the physical features of the earth.

To sum up, the contributions of the 18th century geographers were really commendable. The different viewpoints of geographical thinking that emanated—political, statistical or pure—not only brought the era of traditional thinking to a close but also paved the way for fresh advances in the discipline. This in turn, created the base on which the edifice of scientific geography could be built in the next five decades.