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Founders of Modern Geographical Thought

After the Great Age of Discovery, two leading German scholars i.e. Alexander von Humboldt and Carl Ritter made valuable contributions in the fields of basic sciences—humanities and arts. Both were contemporary, and lived and worked at Berlin for more than three decades. These two scholars have been referred as the founders of Modern Geography. In this chapter a brief account of the contribution made by these scholars will be given.

Alexander von Humboldt

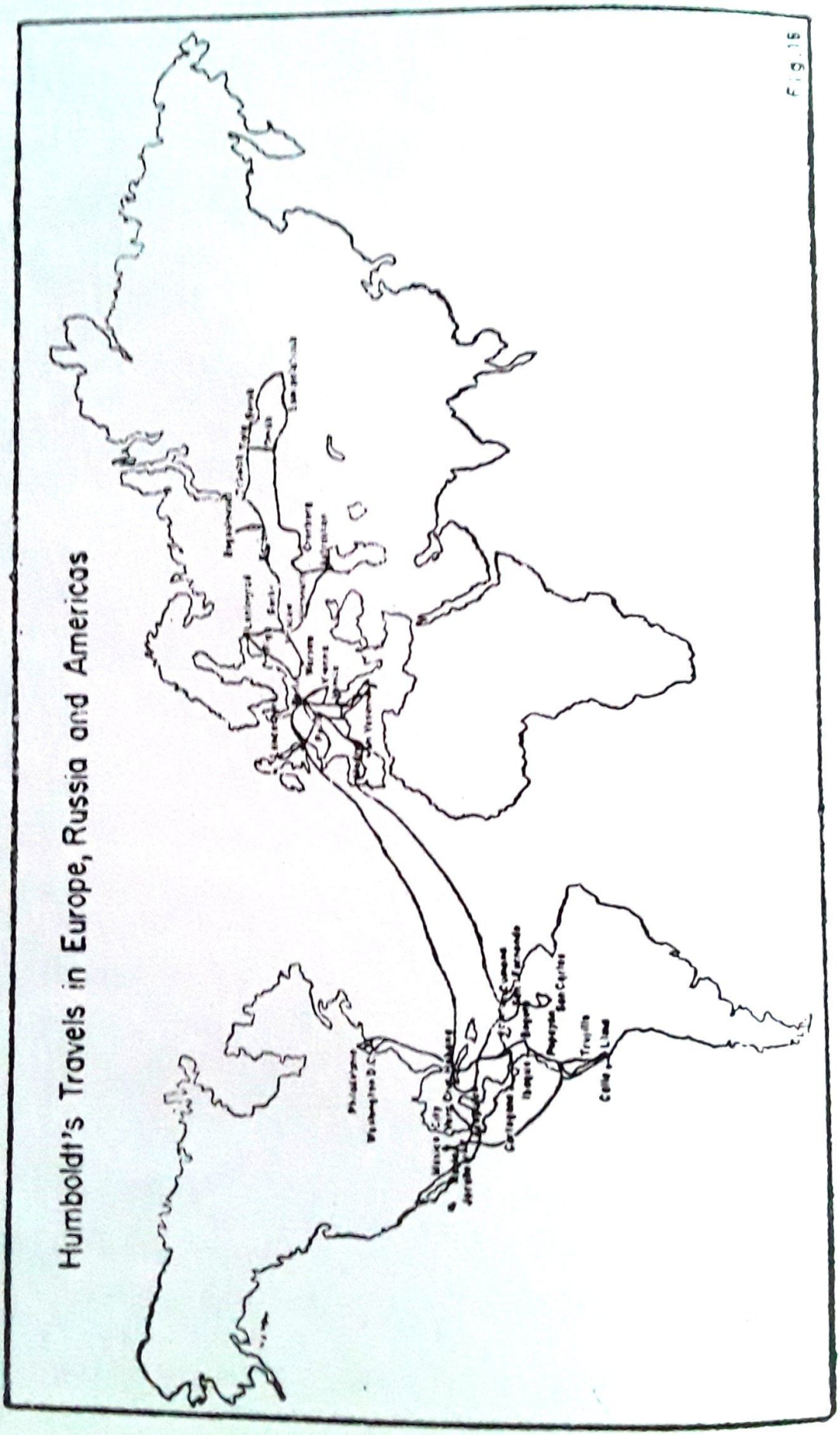
Alexander von Humboldt led the way in the expansion of geography in and outside of Germany. He was a scholar of versatile genius, who contributed appreciably in the fields of geology, botany, zoology, physics, chemistry, anatomy, physiology, history, climatology, geomorphology and all the other branches of geography. He travelled about forty thousand miles and in all his travels, however short, he made multitudinous observations. He performed all journeys with telescopes, sextants, cyanometers (for measuring blueness of the sky) and barometers. With the help of these instruments, he measured accurately the temperature of air and ground, pressure, winds, latitudes, longitudes, elevations above the sea level, magnetic vibrations, nature of rocks, types of plants and their relations to climate, altitude and human attitudes.

Alexander von Humboldt was born in an aristocrat family in Prussia, but his father expired when he was only ten years of age. Alexander after getting education in classical languages and mathematics started his career in the army, but his mother insisted upon him to study economics and to compete in the civil service examination. Later on he studied at Frankfurt and the University of Gottingen, where he studied botany, geology and mineralogy. He was taught by A.G. Warner—the famous geologist, who put forward the hypothesis that all the sedimentary rocks of the earth had been formed by precipitation under water and had been deposited in layers. Humboldt also attended lectures in physics, chemistry and mining. In 1792 he was appointed as the director of mines in the Prussia. He studied the effect of different rocks on magnetic declination and published his first paper in 1793. He became keenly interested in the rock structure of the Alps and visited Bavaria, Austria, Switzerland and Italy. In 1797 he resigned from the government job and planned his journeys to the new and unexplored lands. In Paris, he learned the art of handling various instruments of measurement like sextant, barometers and aneroid barometers.[1]

Adventures and Explorations

In 1798, Humboldt along with a French botanist (A. Bonpland) reached Madrid (Spain). On the way to Madrid, he made daily observations of temperatures and altitudes; and he was the first to make an accurate measurement of the elevation of the Spanish Maseta. From Madrid, Alexander von Humboldt and the French botanist (Bonpland) reached Cumana Port in Venezuela (Fig. 13). Along the sea coast they went to Caracas and explored the Valencia Lake. He noticed that the Lake Valencia has shrunk and fields for the cultivation of crops had been developed on its flat banks. He attributed the shrinkage of the Lake to the deforestation of the neighbouring lands. He established a positive relationship between the forests and rainfall. The idea that more forest means more rainfall still significantly persists.[2]

In 1800 Alexander's expedition explored the Orinoco river and established the truth of its connection with Amazon. The banks and basins of this river were uninhabited. During this


Humboldt's Travels in Europe, Russia and Americas
Fig. 15

venture, Alexander and his colleagues suffered many hardships. They had only banana, wild fruits and fish to eat, and were exposed to the bites of clouds of mosquitoes, ants, equatorial insects, man eating fishes and crocodiles. Under these adverse conditions also Alexander did measurements and established the exact latitudes and longitudes of places. From this virgin region he collected thousands of plant and rock specimens, which were transported to Cuba. In November 1800, they returned to Cumana (Cuba) and studied the economy and society of the people of Cuba. In 1801 Humboldt and Bonpland arrived at Cartgona (Colombia) and from this port they went to Andes, Ecuador and Peru (Fig. 13). Humboldt gave a scientific explanation of crops and the influence of altitude, temperature and vegetation on crops. His description of the vertical zones of the northern Andes is a classic. He also examined the numerous volcanoes of Ecuador and descended in the craters of active volcanoes to collect gases emanating from within the earth. Moreover, Humboldt climbed Mountain Chimborazo Peak (6326 M.) and also observed the influence of altitude on human body. It was Alexander von Humboldt who explained the feeling of dizziness as resulting from low air pressure.[3] In fact this disease is due to the scarcity of oxygen at high altitude.

Traversing the Andes southward, the explorers reached Lima. On the coast of Peru-guana bird droppings were observed which have great manural value. Moreover, the cold water current of Peru was also observed and recorded for the first time. The temperature and velocity of this current were measured. In March 1803, the expedition sailed from Guayaquil to the Mexico Port, namely, Acapulco. He travelled in the different parts of Mexico and observed the impact of landforms on the cultural landscape. Staying for a short period at Philadelphia and Washington the expedition returned to France in 1804.

The adventurous nature of Humboldt did not permit him to stay at one place and therefore in 1806 he made a visit to Vesuvius volcano (Italy). After the completion he wrote his experiences and observation in thirty volumes in French language, which was subsequently translated in a number of foreign languages. This encouraged many young scientists to

investigate the geography of unexplored areas of the world. In his writings Humboldt explained the cause of prosperity of the inhabitants of Mexico to their better utilization of land resources. The idea of digging a canal across the Isthmus was also put forward by him.[4]

In 1829, Humboldt was invited by the Russian Czar at the city of Petersburg (Leningrad) and he was entrusted to explore the virgin lands of Siberia across the Ural mountains. From Petersburg, Humboldt on a horse back, travelled through Kazan, Bogosloski, Tobolsk, Tara, Bersk, Omsk and reached up to the border of Mongolia (Fig. 13). While returning he passed through Omsk, Orenburg and Astrakhan and made a survey of the coastal lowlands of the Caspian Sea. Throughout the Siberian expedition a regular record of temperature, and pressure was kept. On the basis of these observations a result was inferred that temperature on the same latitude varies moving inward from the coast. It was on his advice that a number of meteorological stations were established by Czar in different parts of Russia. It was after this expedition that a world map showing isotherms was prepared for the first time. The concept of continentality was also established by Humboldt. Moreover, the term of permafrost was coined to explain the frozen characteristics of the Siberian soils. It was after this venture that 'climatology' word appeared in the geographical literature which deals with all variations of atmosphere, temperature, humidity, barometric pressure, winds, atmospheric purity and the degree of visibility.[5] Thus he contributed richly in a variety of fields. His major concern was however, to corelate the physical environment with the human and organic phenomena. While dealing with man-nature interaction he included man and his works but did not gave adequate weightage to man as the major determinant. Nevertheless, he portrayed, towns, villages, fields, crops and transport linkages as elements of landscape.

In 1845, the monumental work *Kosmos* of Humboldt was published, which was acknowledged all the world over and was translated in a number of foreign languages. *Kosmos* a comprehensive account of the travels and expeditions of Humboldt was written with the following fourfold objectives: (i) the first is the definition and limitation of physical description of the world as a special and separate branch of knowledge;

(ii) the second is the objective content, which is the actual and empirical aspect of nature's entity in the scientific form of a portrait of nature; (iii) the action of nature on the imaginative and emotion becomes an incentive to nature studies through media of travel description, poetry, landscape, painting and the display of contrasting group of exotic plants; (iv) lastly the history of natural philosophy and the gradual concept pertaining to cosmos as an organic unit are dealt with.

So far as the subject-matter of Kosmos is concerned, in the first volume there is a general presentation of the whole picture of the Universe. The second volume starts with a discussion of the portrayal of nature through the ages by landscape painters and then continues with a history of man's effort to discover and describe the earth since the time of ancient Egyptians. The third volume deals with the laws of celestial space which we would call Astronomy. The fourth volume deals with the earth. In this volume, Humboldt considered man as a part of the earth.

While dealing with the subject-matter of geography, Humboldt coined a term 'cosmography' and divided it into Uranography and geography. In his opinion Uranography is the descriptive astronomy which deals with the celestial bodies. Geography on the other hand was confined to physical geography which deals with the terrestrial part. Geography, according to him is the description of the earth which deals with the interrelationship of phenomena that exist together in an area.[6]

Humboldt believed in the inductive method and emphasised the importance of empirical method of research. He also made comparative study of the different geographical regions especially that of the steppes and the deserts. He gave importance to the geographical representation of data on maps and the utility of maps for geographical studies. He believed in the unity of nature and accepted the idea of inherent casualty (casual connection).

Humboldt believed that all the races of man had a common origin and that no race is superior or inferior to others. Moreover, he stressed the need of casual observations of nature in the field and for the careful measurement of observations. It was an approach towards theory building and model making.

In brief Humboldt sought answers to a great variety of specific questions. For example, he attempted to develop a general picture of the distribution of average temperatures in the world in relation to the distribution of continents and oceans. The influence of altitude in the tropical areas of plants, animals and human life was also attempted by him. Humboldt concentrated largely though not exclusively on physical features, climate and vegetation. It was because of these contributions that he is considered as the founder of plant-geography, and climatology as well as the founder of the modern geography.