CHAPTER 6

AN END AND A BEGINNING: ALEXANDER VON HUMBOLDT AND CARL RITTER

The fear of sacrificing the free enjoyment of nature, under the influence of scientific reasoning, is often associated with an apprehension that every mind may not be capable of grasping the truths of the philosophy of nature. It is certainly true that in the midst of the universal fluctuation of phenomena and vital forces—in that inextricable network of organisms by turns developed and destroyed—each step that we make in the more intimate knowledge of nature leads us to the entrance of new labyrinths; but the excitement produced by a perception of discovery, the vague intuition of the mysteries to be unfolded, and the multiplicity of paths before us, all tend to stimulate the exercise of thought in every stage of knowledge. The discovery of each separate law of nature leads to the establishment of some other more general law, or at least indicates to the intelligent observer its existence.

The two great masters of German geography—Alexander von Humboldt (1769–1859) and Carl Ritter (1779–1859)—loom large across the pages of the history of science. Both lived and worked in Berlin for more than 30 years, and both died in the same year. They were acquainted, but not intimately so. Never before or since have geographers enjoyed positions of such prestige, not only among scholars but also among educated people all around the world.

Many writers refer to Humboldt and Ritter as the founders of modern geography, but there are also good reasons for thinking of them as bringing the period of classical geography to an end. Using the large volume of new information resulting from the voyages of exploration, Humboldt and Ritter, each in his own way, produced massive syntheses. Although these syntheses made use of the new concepts and methods of study developed during the preceding two centuries, they nevertheless sought to present universal knowledge, just as Strabo had done and as had been attempted during the Age of Exploration of Munster, Varenius, Bütting, and others. But since 1859 the volume of recorded observations about the world and the individual’s place in it has increased many thousands of times. In the nineteenth century the Age of Specialization came into being. No longer could any one scholar hope to embrace universal knowledge. The classical period had come to an end (Hartenhorst, 1959:48–54).

ALEXANDER VON HUMBOLDT

Alexander von Humboldt was born into the Prussian landowning aristocracy. His father, an officer in the Prussian Army, died when Alexander was 10 years old. He and his older brother Wilhelm were brought up by their mother, described as "a very aloof and self-contained woman who provided for the education of her sons but gave them no intimacy or warmth. The sons were expected to show her respect and follow her directions" (Kelner, 1983:6). Alexander came to dislike the cold, constrained atmosphere of his home and lavished his affection on his brother and later on his brother’s children. Alexander never married.

The brothers were educated at first by tutors, from whom they received an excellent grounding in classical languages and mathematics. Alexander had little interest in science but instead decided to undertake a career in the army. This desire was opposed by his mother, who insisted that he study economics as a preparation for a position in the civil service. However, events outside of his formal schooling combined with an almost insatiable curiosity about a great variety of matters led him toward a career in science. In Berlin his mathematics tutor introduced him to a group of liberals and intellectuals who gathered at the home of the Jewish philosopher, Moses Mendelssohn (the grandfather of Felix Mendelssohn, the composer). Jews and gentiles joined in discussions of the social inequities of an aristocratic society and drew up plans to do something about these things. Alexander also met the physician, Marcus Herr, a disciple of Immanuel Kant, who organized a series of lectures on scientific subjects, including demonstrations of scientific experiments.

When Alexander was ready to attend a university, he was already excited
about the various aspects of the physical world. After a short while at a small factory management, as his mother's insistence. He also used the time to increase his knowledge of Greek and Latin, and began to study botany. In 1798 he was appointed as a professor at the University of Göttingen. He was well liked by his students and gained a reputation for his knowledge and teaching skills.

Vernet was the organiser of the widely supported polygons under water, and had been deeply impressed by the experiments of the French scientist, C. M. d. La Condamine, to measure the arc of the meridian along the equator in 1735. Humboldt and Bonpland sailed in 1799, but soon after they were interned by the British at Malta.
HUMBOLDT’S AMERICAN TRAVELS

Humboldt’s travels in the “equinocial regions of the new continent” began at Cumaná in Venezuela (Fig. 18). First, the two men went to Caracas and began exploring this long-settled part of the country. One of the first places they investigated was the Basin of Valencia in the midst of which is the Lake of Valencia, some 50 miles southwest of the capital. Humboldt noted that at one time the lake was much deeper and had an outlet to a tributary of the Orinoco but that in 1799 the lake had no outlet. Crops were being grown on the flat lakebed soils from which the lake waters had receded. Why should this event have taken place? The connection between the removal of forests and the drying up of rivers had been predicted by Buffon and others, but Humboldt was the first to test this theory by confronting it with observed facts in a particular place. Here is what he had to say about the Lake of Valencia:

Felling the trees which cover the sides of mountains, provokes in every climate two disasters for future generations: a waste of fuel and a scarcity of water. Trees are surrounded by a permanently cool and moist atmosphere due to the evaporation of water vapor from the leaves and their radiation in a cloudless sky. They have an effect on the incidence of springs, not as was long believed by a peculiar attraction for the atmospheric vapor but because they shelter the soil from the direct action of the sun and thereby lessen the evaporation of the rainwater. When forests are destroyed, as they are everywhere in America by the hands of European planters, the springs are reduced in volume or dry up entirely. The river beds, now dry during part of the year, are transformed into torrents whenever there is heavy rainfall in the mountains. Turf and sod disappear with the brushwood from the sides of the hills; the rainwater rushing down no longer meets with any obstructions. Instead of slowly raising the level of the rivers by progressive infiltration, it cuts furrows in the ground, carries down the loosened soil, and produces those sudden inundations which devastate the country. It follows that the destruction of the forests, the lack of springs, and the existence of torrents are closely connected phenomena (Humboldt, 1814–25, Williams translation, 1826–8, 143).

Around the Basin of Valencia, Humboldt observed that the once continuous cover of tropical forest had been entirely removed and the lands were used for agriculture. The Lake of Valencia became a famous example of the application of a concept formulated by earlier writers but without carefully recorded direct observations to support it. Curiously, the idea that forests cause an increase in rainfall still persists.
Humboldt charted some of the volcanoes of Mexico. As he explained, the expedition encountered unusual phenomena on the world’s highest mountain, attempting to reach the summit. Humboldt and his colleague, the Austrian explorer Johann Reinhold Forster, climbed to an altitude of approximately 15,000 feet, which was the highest point reached until the 20th century. They observed the effects of the high altitude on human health, noting that the air pressure decreased rapidly with increasing elevation. This phenomenon was crucial for understanding the effects of altitude on the human body. The team also observed the vegetation changing from tropical rainforest to alpine tundra as they ascended. They collected samples of soil, plants, and animals to study the effects of altitude on ecosystems.

Humboldt and Forster then traveled to the Andes, where they encountered a variety of marine species that were unusual for such a high altitude. They observed the marine life thriving in the cold water of the Humboldt Current, which flows along the coast. This current was crucial for the distribution of marine species along the coastal regions of South America. They also studied the geology of the Andes, noting the presence of volcanic rock and the effects of weathering on the landscape.

The expedition also explored the Amazon Rainforest, where they encountered a diverse array of plant and animal species. They observed the ecological systems of the rainforest, noting the importance of the forest for maintaining the biodiversity of the Amazon region. They also studied the effect of deforestation on the ecosystem, noting the loss of habitat for many species.

Humboldt’s observations were crucial for understanding the effects of altitude on ecosystems and the distribution of marine species. They also contributed to the study of the Amazon Rainforest and the importance of conservation efforts to protect this delicate ecosystem.

In conclusion, the Humboldt and Forster expedition was a seminal event in the history of scientific exploration. Their observations and discoveries contributed significantly to our understanding of the natural world and the importance of biodiversity. The expedition also highlighted the importance of collaboration between scientists and the local communities in understanding and conserving the natural world.
The French Revolution (1789-1799) was a period of dramatic change in France, and ultimately in Europe. The revolution led to the fall of the Bourbon monarchy and the rise of Napoleon Bonaparte. The revolution was marked by widespread social and political upheaval, including the guillotine, the formation of the First French Republic, and the Napoleonic Wars. The revolution had a profound impact on the way people thought about power, freedom, and equality, and it continues to be studied and controversial to this day.
Mexico seemed to have an abundance. He suggested his explorations with the wealth of statistical data he found in New Spain, organized and enriched the graph of the annual temperature in the region. The numerous digressions that he made across the basins of Central America and through the Andes showed how sectionally continental climates can be similar. His daily observations revealed the distinct nature of the climate in different parts of the region.

On his return to Europe, Humboldt also observed and described the permanence of a frozen soil, which is now called permafrost. He saw the remains of a large part of Siberia that was not covered by the snow during the long winter.

In Berlin, Humboldt's reputation as a geographer and climatologist was sustained by his attention to the natural world. He continued his work on climate and geography, and his ideas on the influence of geographical location on climate were widely discussed. His work on the theory of climate influenced the development of modern climatology.

In the winter of 1827-28, Humboldt offered a series of public lectures at the University of Berlin. His lectures were well received, and he continued to travel and conduct research for the rest of his life. His legacy as a geographer and climatologist is still felt today, and his work continues to influence the study of climate and geography.
the earth, and a legend concerning the origins of the religion. He always
emphasized the unity and coherence of nature; although he made clear the
existence of natural forces, he taught that the unity of nature was not
impeded by their separate actions. His influence on the development of
the concept of the cosmos was profound. He is credited with
introducing the idea that the earth is at the center of the universe, and
that the movements of the stars are caused by the rotation of the earth.

Humboldt believed that the aim of science was to understand and
describe nature, not to manipulate it for human benefit. He emphasized
the importance of observing nature as a whole, rather than focusing on
isolated phenomena. This approach, known as holism, has had a lasting
influence on the study of natural science.

We are still very far from the time when, he said, we will be able to
understand the classification of phenomena according to their natural
connections, or the observation and description of natural forces. This
is the aim of science, and for this purpose we must be able to
formulate general concepts, or to transform them into a system of
classes, which is the work of the philosopher. 

Humboldt's ideas were influential in the development of modern
science and have had a lasting impact on the way we think about the
natural world.
Carl Ritter was born in 1779. At 10 years old, he already showed a strong interest in geography and cartography. His father was a physician, and when he died, the young Carl was left without much financial support for his family. At the age of 15, he entered the University of Leipzig, where he studied philosophy and mathematics. Later, he went to the University of Berlin, where he studied under Professors Eberhard and Fichte.

In the early 19th century, there was a growing interest in the field of geography, and Ritter, along with his colleague, Father Johann Caspar von Maria, developed a new method of teaching geography. This method, known as the "Ritter-Maria" method, was based on the idea of teaching geography through the study of maps and charts. It was a revolutionary approach, and it quickly gained popularity.

In 1804, Ritter was appointed as a professor of geography at the University of Berlin. He continued to teach there until 1810, when he was appointed as the first director of the Prussian Geographical Institute in Berlin.

Ritter's work in geography was not limited to teaching and research. He was also a successful cartographer, and he published several maps and atlases, including the "Neue Karte der Welt" (1804) and the "Staatskarte von Preussen" (1808).

In addition to his work in geography, Ritter was also a skilled farmer. He owned a farm in Brandenburg, and he used the principles of his geography teachings to improve his farming practices.

Ritter's influence in geography and cartography was significant, and his work continues to be studied and admired today.
Ritter insisted that geography should be empirical, in the sense that the general laws and facts are best established by observation and personal experience. He maintained that the conclusions must be supported by general laws and tests from previously and well-established experiments. He did not trust the conclusions of a geographer from Slavonia whom he believed was the author of a geographical treatise. He was fond of relating this passage from a conversation he once had with a friend: "I am not sure that I would trust a geographer from Slavonia whom I met on a journey. He spoke of the climate of his country with such enthusiasm that I suspected he had never left it. I advised him to travel and return to Slavonia with a fresh perspective. He assured me that he intended to do so, but I doubted his sincerity. I have since learned that he never returned to Slavonia, and I suspect he fled the country fearing exposure of his ignorance. He was a poor traveler and lacked the common courtesy to return his glasses to the innkeeper."

RITTER'S GEOGRAPHICAL IDEAS

Ritter's geographical ideas were developed during his tenure as a professor at the University of Berlin. He examined ancient geographical texts, such as those of Ptolemy, and discovered the errors in their descriptions. He became known for his geographical voyages, and his comprehensive and accurate maps of the New World were noted for their accuracy. He wrote a number of influential works, including "The New World," "Geographical Essays," and "Geographical Institutes." His work was popular in his time and had a lasting influence on the development of modern geography.

Ritter's ideas concerning the influence of climate on human activity and the development of civilization were based on his observations of the different climates of the world. He believed that the climate of a region determined its population density and the type of agriculture practiced. He also believed that the climate influenced the development of language and culture. The climate of a region was seen as a determining factor in the development of a society, and Ritter's ideas were influential in the development of the field of climatology.

Ritter's concept of the "nature of the earth" was based on his belief in the empirical method. He believed that the study of the earth should be based on observation and personal experience, rather than on the testimony of others. He emphasized the importance of empirical evidence in the study of the earth, and he believed that the conclusions of a geographer should be supported by general laws and tests from previously and well-established experiments. He was fond of relating this passage from a conversation he once had with a friend: "I am not sure that I would trust a geographer from Slavonia whom I met on a journey. He spoke of the climate of his country with such enthusiasm that I suspected he had never left it. I advised him to travel and return to Slavonia with a fresh perspective. He assured me that he intended to do so, but I doubted his sincerity. I have since learned that he never returned to Slavonia, and I suspect he fled the country fearing exposure of his ignorance. He was a poor traveler and lacked the common courtesy to return his glasses to the innkeeper."

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THE ERDKUNDE

Ritter, like Humboldt, produced one great work that represented his major scholarly achievement. This was *Die Erkunde*. The translation of the full German title presents the basic purpose: The Science of the Earth in Relation to Nature and the History of Mankind; or, General Comparative Geography on the Solid Foundation of the Study of, and Instruction in, the Physical and Historical Sciences. Before Ritter became the professor of geography at Berlin in 1820, he was still thinking of geography as the basis for the writing of history. The first two volumes of the *Erkunde* (1817–18) were intended to be followed by a study of history. But when Ritter went to Berlin he decided to devote himself to doing a more thorough piece of work on the geography. In 1822 he published a second edition of Volume I and in 1832 a second edition of Volume II. But by this time he realized the magnitude of the work he had started. After 1831 he gave up many of his positions so that he could devote himself more fully to the completion of the *Erkunde*. Between 1832 and 1838 he completed six more volumes, and between 1858 and 1859, 11 more. Yet the 19 volumes of the *Erkunde* Ritter actually finished only covered Africa and a part of Asia.

Unlike Humboldt, Ritter’s great work was largely put together on the basis of other people’s observations. He said that his field studies in Europe made it possible for him to interpret what other people reported. Fritz Kramer comments on the interesting point that Ritter’s descriptions of places he had never seen were vivid and accurate, whereas his descriptions of places he had seen often lacked zest (Kramer, 1959).

In contrast to the clarity of his lectures, Ritter’s published works are often obscure. Scholars have struggled to find suitable translations for some of his passages that would make sense in another language and yet not do violence to his ideas. A student of the German language can have endless fun with Ritter. But one must arrive at the conclusion that Ritter himself was neither critical of his own ideas nor resolved about what he wanted to say. He was expressing a general feeling about the subject, and many of his assertions of relationships have never been and could never be subjected to rigorous verification. One may be pardoned the somewhat irreverent observation that one way to gain the reputation for being a profound thinker is to write obscurely.

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5 For example, the discussion of the meaning of one of Ritter’s frequently quoted statements that geography is the study of “der industriell erfuhrten Flächen der Erdenberfläche” (from Ritter, 1852) in Hartshorne, 1959:57.

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CHAPTER 6. AN END AND A BEGINNING

RETROSPECT

So these two great scholars, who died in the same year in Berlin, each in his own way attempted to establish a “new geography.” Each tried to embrace the knowledge of humankind concerning the earth as the home of man. Both of them saw the field of geography as dealing with things and events of diverse origin that were interconnected in segments of earth space, as did Kant and others. Both were tireless workers, who wrote many books and whose influence on the scholarly world was very great. Both recognized the need for seeking generalizations, and both recognized that little progress toward higher theory could be made in their time. But both had confidence that continued use of proper geographical methods would eventually bring light the inner meaning of the universe. Humboldt was an agnostic; Ritter once remarked that, although the Kosmos was a magnificent piece of work, one found in it no single word of praise for the Creator. Ritter saw all of his studies of the earth and man as revealing more and more of God’s plan.

Yet the two men were fundamentally different in their approach. Humboldt could not look at the world around him without finding innumerable questions demanding answers. He not only described what he saw with care and precision, but he also formulated hypotheses to account for the things he observed—and then he also subjected his hypotheses to the test of new observations. Ritter also had a vision of an ordered and harmonious universe, but instead of asking questions about it, he wanted to communicate to others the meaning he had found. As a teacher he wanted to make clear to his disciples how God’s plan was revealed in the harmony of man and nature. Each in his own way was enormously successful, and each enjoyed wide personal prestige.

When Humboldt and Ritter died there was no one to replace them. Classical geography had come to an end—no individual scholar could hope any longer to master the world’s knowledge about the earth. The specialization of subject-matter disciplines resulted in the development of new technical jargon, new paradigms of scientific behavior. As a result much that had been called geography was partitioned among a variety of logically defined fields. In Germany no one was appointed to fill Ritter’s chair. Some decades later when geography was reestablished as a university study, the scholars invited to teach it had had no previous training in a field called by that name.

What do Humboldt and Ritter mean to us today? Ritter did influence his disciples to identify a new scientific geography based on the organic unity of man and nature (Gayon, 1860). But his teleology, reflecting the contemporary thinking of such philosophers as Kant and Herder, became outdated and raised a barrier to the continued acceptance of this kind of new geography. Moreover, Ritter’s regional studies deal for the most part with such large areas that the material he included had to be highly generalized. The interconnections he described could not be perceived by direct observation.
Today Ritter's *Erdbünde* has chiefly an antiquarian interest. Humboldt's systematic studies are also outdated, although the methods he used represent important steps in the progress of geography. But Humboldt's regional studies "cannot become obsolete" (Harnsorne, 1939:82), especially his comparative studies of New Spain and Cuba, which provide invaluable material for studies in historical geography. Humboldt dealt with areas that were small enough so that he could discuss all the factors relevant to a problem that could be tested by direct observation — for example, the study of the Lake of Valencia Basin in Venezuela. These two great masters of the nineteenth century mark the culmination of thousands of years of effort to push knowledge out beyond the far horizon, and they both point to new horizons to be conquered along the road ahead.

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**PART TWO**

**MODERN**

A major innovation in the world of scholarship took place in nineteenth-century Germany. The university as an institution first appeared in Medieval Europe when charters were issued by religious or secular authorities giving certain faculties the right to teach. The University of Paris in the twelfth and thirteenth centuries became the chief center (other than Rome) for the teaching of orthodox Christianity. But in 1809 Wilhelm von Humboldt, the brother of Alexander, founded the University of Berlin with the support of King Friedrich Wilhelm III of Prussia. For the first time anywhere, the attachment of either faculty or students to any particular religious creed or school of thought was explicitly repudiated. Humboldt universities were places where the accepted dogma of state and church was taught to students. After 1809 the university as a free community of scholars began to appear.

Geography as a field of advanced study taught by professionally qualified individuals first appeared in Germany in 1874. Within a few decades geography departments offering graduate training leading to advanced degrees were established not only in Germany, France, and Britain but also all around the world. This was the "new geography," and it was guided for the first time in history by professional geographers. A profession had come into existence that could establish the paradigms of geographical study.

We date the modern period in the history of geographical ideas with the establishment of professional staffs in universities.