Chapter Seven

Geography

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'*The goal of Geography is nothing less than an understanding of the vast interacting system comprising all humanity and its natural environment on the surface of the Earth*.' (Ackerman, 1963).

'*Geography is the study of the earth as a home to humankind*.' (Johnston, 1985)

When questioned about the purpose of geography, most candidates for student teaching give one of three answers: geography is 'about everything', 'saving the planet' or 'making a difference'. This means that after learning the subject at school, spending at least three years at university studying geography and deciding to enter the teaching profession, these geographers lack a conception of their discipline. This is indeed a peculiar situation of the times we live in and I don't want to delve into the reasons why – this is not the purpose of this chapter. It is true that the scope and range of geographical study are vast, encompassing an array of traditions and approaches, which are difficult to capture in one neat definition. However, this does not excuse the absence of disciplinary clarity, which I would suggest is a significant problem (see Matthews and Herbert, 2004). If you want to teach a subject you need to be able to clearly communicate to pupils what your subject is about and what it is for. So, this chapter aims to explore the nature of geographical knowledge and enquiry, its origins, methods, epistemology and value, and how we can introduce children to this discipline as a school subject.

The evolution of geography as a discipline

As Edward Ackerman notes, geography is the study of the variation of and interaction between physical and human phenomena across the surface of the world. This 'surface' includes the earth's crust (lithosphere) and its landscape, flora and fauna, the atmosphere, people and culture, the built environment and political territories. Of course, geographers are not the only students to study rocks, soil, flora and fauna, rivers, trade, political territories and culture, and hence we share these objects and their related concepts with other disciplines. What distinguishes the geographer's perspective is that we are interested in the relationships between different phenomena that give rise to spatial patterns and areal differentiation. Richard Hartshorne, explains it thus:

> The heterogeneous phenomena which these other sciences study by classes are not merely mixed together in terms of physical juxtaposition in the earth surface, but are causally interrelated in complex areal combinations. Geography must integrate the materials that other subjects study separately. (Hartshorne, 1939: 464)

Geographers begin with the question *where*? Locations, as a fixed point of spatial reference, are to geographers as dates are to historians. Once we know where something is we can begin to examine what else is found at that location, what is around it and how it is *related* to surrounding phenomena. We need to understand the *processes* that shape the physical and human phenomena, how they *interact* and, therefore, *why* things are located where they are, as well as how spatial arrangements and places *change* with time. Finally, geographers seek to understand humans in their environment, how we change and are changed through interacting with it. For this reason, geography is often included as a humanities subject.

The human quest to comprehend differences between areas of the earth's surface can be traced back to Ancient Greece and Rome. The term 'geography' derives from two Greek words *ge*o meaning earth and *graphia* meaning describing or depicting. Nevertheless, spontaneous curiosity about the world and geographical thinking preceded any established geographical tradition. Before Eratosthenes estimated the circumference of the earth and devised parallels and meridians for the globe, and Ptolomy drew his world map, Plato used the terms *chora* and *topos* in his discussion of the process of becoming (Cresswell, 2013). *Chora* refers to the place or setting for becoming and *topos* was the achieved place. Following Plato, Aristotle used *chora* to describe a country and *topos* as a particular region or place within it. Although neither Plato nor Aristotle would be described as geographers, Aristotle went on to develop a sophisticated theory of place. Building on the work of Eratosthenes, the 'science of regions' or chorology was at least conceived of in Roman times. One such study was Strabo's (7AD) seventeen-volume *Geographica* [1], an encyclopaedic description of the known, inhabited world of the time.

The Greek and Roman traditions of mapping, measurement, geographical description and hypothesising about human interactions with their environment were further developed under the Muslim empires of the Middle Ages, with the help of translation into Arabic. In mathematical geography, the size and shape of the earth were calculated, as were the solar length of a year and the Precession of the Equinoxes (Ziauddin, 1965). Hydrological studies were conducted of the Nile and the canal systems of Mesopotamia, including the search for 'hidden water' in mountains (*Ibid.*). Al-Mas'udi and al-Idrisi were two prominent geographers who studied environmental effects on life and the qualities of people in different climate zones.

Following the Renaissance there was a veritable tradition of travel writing in Europe and beyond, but it was not until the 19th century that the disciplinary foundations were laid and geography positions were established at universities. In particular, we have to thank Immanuel Kant (1722-1804) for providing the philosophical groundwork. Kant lectured in physical geography for 30 years at Königsberg (now Kaliningrad). Finding the subject disorganised and lacking direction he proposed two ways of classifying empirical data: in accordance with their nature or in relation to their position in time and place. The former being a *logical classification* is a precondition for studying the spatial variation of particular geographical 'layers' or phenomena (which became theoretical or systematic geography). The latter is a *physical classification* and provides the basis for the study of the interaction of phenomena in given places and regions (regional geography). For Kant, between them history

and geography were able to fill the total span of scientific knowledge – history being the study of time and geography the study of space (Holt-Jensen, 2009: 41). Kant's view was possible because the drawing of disciplinary boundaries would have to wait until later in the nineteenth century.

The German geographers Alexander Humboldt (1769-1859) and Karl Ritter (1779-1859) also conceived of geography as the study of the inter-relationship between phenomena in a given locale. However, Hartshorne (1958) suggests that only later did they become aware of Kant's work and that they may well have arrived at a similar conception independently. They also developed a scientific method for geography, taking an empirical approach to their studies of Central America (Humboldt) and Central Asia (Ritter). Through extensive fieldwork and data collection Humboldt and Ritter went beyond description in their quest for identifying patterns and relationships through a comparative method. Humboldt called his scientific approach *physikalische* (not to be confused with physical geography) through which he sought to establish relations between the flora, fauna, humankind, and conditions of landscape and climate. The concept of *Landshaft* (a small regional unit) became popular amongst German geographers who were seeking to find unity and purpose in the landscape (a similar tradition evolved in France with *pays* identified by Vidal de La Blache in his (1908) *Tableau de la Geographie de la France*). For Ritter this unity was god given, while Humboldt leaned towards aesthetic interpretation.

Geography has sometimes been referred to as the Mother of All Sciences, given its all-encompassing nature and because other disciplines grew from this tradition, such as geology and anthropology (Livingstone, 1992). Indeed, Humboldt's final work was a book titled *Cosmos* - depicting 'all that we know of phenomena of heaven and earth' (cited in Livingstone, 1992: 136). The holistic and descriptive nature of geography did not help its quest for university recognition. At the end of the nineteenth century science was moving towards specialisation and mechanical rather than teleological explanations, especially under the influence of Darwin's work. Alfred Hettner (1859-1941) and later Richard Hartshorne (1899-1992) were influential in geography's transition from a chorographic to a chorological science – understanding the collective existence of phenomena in space (Holt-Jensen, 2009). One seminal moment that aided geography's cause was Halford Mackinder's paper, *On the Scope and Methods of Geography*, delivered to the Royal Geographical Society in 1887. Mackinder made a case for geography as the 'science of distribution' that bridged the human and natural worlds (Mackinder, 1887: 174). Geography's new scientific approach was developed in Britain by T.H. Huxley and in United States by William Morris Davis (1850-1934), both of whom helped to establish the sub-discipline of geomorphology. Huxley's *Physiography* (first published in 1877) was a study of nature encompassing the sciences of botany, geology and zoology. Encouraging local field study and experimentation, it became a popular school book at the time. Davis' theory of landscape evolution through cycles of erosion influenced the direction of the discipline for years to come. Geomorphology, as the study of landscape change, distinguished the geographical study from that of geology.

Following the Second World War geography was heavily criticised for its overly descriptive nature and lack of scientific rigour. In some schools geography lessons amounted to little

more than cataloguing of factual information about places. The response from within the discipline was a quantitative revolution giving rise to spatial analysis and spatial models. Examples include Walter Christaller's central place theory and John Stewart's gravity model (see Holt-Jensen, 2009). In Sweden Torsten Hägerstrand explored the relationship between tradition and innovation using mathematical and statistical models. 'In focusing on the *process*, Hägerstrand made a clear break with the current regional tradition', suggests Holt-Jensen (2009: 88). Richard Chorley and Peter Haggett's *Frontiers in Geographical Teaching* (1965) and *Models in Geography* (1967) were seminal texts in the new paradigm. Haggett's model for the study of spatial systems was based on six geometrical elements: movements, channels, nodes, hierarchies, surfaces and diffusion.

Yet, by the 1970s such models were in turn criticised for minimising the human dimension and failing to capture real behaviour. The new radical and Marxist geographers shifted their attentions to inequality, social justice, 'Third World' development, racial discrimination and environmental mismanagement. David Harvey is perhaps the most prominent geographer to emerge from this period with publications including *Social Justice and the City* (1973) and *Justice, Nature and the Geography of Difference* (1996). More recently, social theories of post-modernism and post-structuralism have taken some modern geographers in novel directions including children's geographies, ethical consumption and the geography of emotion and perception, and away from the 'science of space'. Nevertheless, in university departments today we can find geographers studying glaciers, rivers, climate change, tectonic and other hazards, development, migration, globalisation, political change, economic change and conflict, as well as regional specialists.

Geography's epistemology

Drawing on the earlier work of Hettner, Richard Hartshorne's *The Nature of Geography* (1939) is arguably the most comprehensive account of the science of geography. Hartshorne went further in explaining the relationship between systematic geography (spatial theory) and regional geography (area studies). While many geographers may identify with one tradition, what matters for geography education is that both approaches are present. Here, we will examine why.

The two branches of geography, systematic and regional, can be illustrated in the following way (Figure 5). Systematic geography focuses on one geographical phenomenon or 'layer' of the earth's surface at a time (the biosphere in the diagram) and explores how it varies with respect to other geographical layers. Regional geography or area studies examines the totality of geographical phenomena or layers, and how they are related, at a given locale or region.

INSERT FIGURE 5 HERE

Figure 5: Conceptualising Systematic and Regional Geography

Systematic geography is a nomothetic pursuit in that it aims to develop generalisations: concepts, models, theories and principles about how things are spatially related. Geographers

do this by examining one geographical phenomenon (e.g. glaciation or population) at a time – how it varies in space and how it is influenced by other phenomena. Systematic geographical knowledge has evolved as a series of sub-disciplines (geomorphology, climatology, urban geography, political geography) each of which is related to its own branch of science (geology, meteorology, planning/urban studies, political science – see Figure 6). Geographers draw from these individual sciences using the concepts constructed for the study of its specific object (lithosphere, atmosphere, settlements, political ideas/institutions). However, the geographer utilises these concepts for a different purpose: to comprehend spatial relationships and patterns. Because geographers are interested in how objects are associated with other objects they may modify generic concepts or invent new ones (e.g. sphere of influence). This is important because no concept can capture all of the characteristics of an object; each discipline will view an object from its own perspective and devise concepts related to its particular intellectual quest.

INSERT FIGURE 6 HERE

Figure 6 Sub-disciplines of Systematic Geography and their Relationship to Regional Geography (Standish, 2014; redrawn from de Blij and Muller, 2012).

The value of nomothetic science is that by abstracting from the real world we can begin to see patterns of behaviour and relationship that are not apparent at a more concrete level. With the systematic approach geographers are seeking explanations of the behaviour and patterns of phenomena. Its knowledge structure is therefore hierarchical – aiming for greater precision, certainty and truth (Bernstein, 1999). Some examples of geographical theories and models include the Bradshaw Model, the Demographic Transition Model, the Gravity Model, the Burgess Land Value Model, the Core/Periphery Model, Weber's Industrial Location Theory, the Heartland Theory and Butler's Model of Tourist Resort Development.

When constructing *propositional (theoretical) knowledge* the danger is that the theory becomes too removed from the real world and unable to explain the behaviour of the phenomena in question. All sciences experience this tension between the need for universal laws and the facts and circumstances of particular cases. Therefore, disciplines need *contextual (empirical) knowledge* – the facts, data and observations of human and physical features of the earth's surface. By its very nature contextual knowledge cannot be abstract and therefore does not give rise to generic concepts or theories. In contrast to propositional knowledge, it is horizontal in structure; so that studying new places and regions adds to existing knowledge – but sideways rather than hierarchically.

However, it would be a mistake to view regional geography as simply the compilation of facts about a locale. Rather, the significant question for regional geographers is: 'What are the inter-relationships among phenomena that produce this particular set of features?' (Slater, 1982: 3). This task requires *synthesising knowledge* from geography's sub-disciplines:

> Cultural, political and economic processes together shape and structure the specific regions under investigation and it is only through the study of their interrelationships that the regional specificity can be retraced. Such a study involves a process of synthesis, a process that takes the results of analysis, the detailed studies of particular aspects of society and draws out the web of relationships that generates and binds them to produce spatial differentiation. (Gilbert, 1988: 218)

Because places and regions are a product of a complex web of interactions this method presents a problem of selecting the geographical criteria and also the starting point, both important for constructing a curriculum. Hartshorne suggests that no geographical phenomena should be discounted if one is aiming to depict something whole. However, not all geographical phenomena are equally significant in shaping the character of a region. The character of regions can be strongly influenced by mountains (Himalayas), islands (Caribbean), hot deserts (North Africa), abundance of hydrocarbons (Gulf States), rainforest (Amazon) or religious traditions (South Asia).

Both teachers and student of geography must make a determination about which geographical factors and features they see as important for their particular geographical description (Lambert, 2014). The selection of these is subjective, but purposeful: exploring the relationships that account for spatial differences. The student must account for their selection and how their regions are constructed. Clavel (1998) notes how the regional method depends upon substantial knowledge of the region in question, including the history of the area in question. The regional method does not demand a complete history of the region, but rather the student or teacher should select those aspects from the past that are significant for its contemporary geography. For example, to account for the contemporary geography of the Middle East it is necessary to understand the significance of Jerusalem to the three Abrahamic religions, as well as the modern-day founding of the state of Israel.

Let us consider now in a little more depth how these two branches of geography work together. We have already noted that propositional knowledge develops by abstracting from context. However, if its generalisations, models and principles are of value they must necessarily explain aspects of the real world. This can be done by testing or applying them in different contexts. This does not mean that models will perfectly predict patterns and behaviour on the surface of the earth. However, in order to say something meaningful about spatial arrangements we should be able to find evidence of their principles at work. In the course of applying generic models and principles the geographer may well discover imperfections and errors, forcing them to go away and refine their ideas and models. The process of hypothesising, testing, analysis and verification of knowledge is known as *procedural knowledge*; procedural knowledge being the third element of disciplinary knowledge (alongside proposition knowledge and contextual knowledge).

So, while the reliability and value of generic concepts and theories are dependent upon their application in different contexts, ‘regional geography in itself is sterile; without the continuous fertilisation of generic concepts and principles from systematic geography it could

not advance to higher degrees of accuracy and certainty in interpretation of its findings' (Hartshorne, 1939: 468).

In the end, geography, like history, is an integrative discipline. While knowledge in its sub-disciplines may be organised hierarchically, what matters to the geographer is the ability to understand the connections across areas of systematic knowledge, including how humans interact with their environment, leading to areal differentiation.

Geography as a school subject

School subjects should introduce children to the disciplines that are the fountains of human wisdom and creativity. Inevitably and ideally, they will be a simplified form of the discipline and will never include all that the discipline explores, nor it's more complex nuances. Decisions need to be taken as to how best to present a discipline to pupils. The following matrix (Table 1) is derived from the work of American and British geographers who have done just this (Pattison, 1961; Association of American Geographers/National Council for Geographic Education, 1984; Jackson, 2006; Matthews and Herbert, 2008; Gersmehl, 2008). That different exercises on different sides of the Atlantic achieved a similar disciplinary framework is noteworthy, and suggests a good starting point for teachers.

INSERT Table 1 HERE

Table 1: Geography's Analytical Concepts (Standish, 2014)

Phil Gersmehl (2008) questions whether geography needs human – environment interactions as a foundational concept because he feels this idea is encapsulated within the spatial and area studies traditions both of which examine people in their environments. Certainly, people's interaction with their different environments is at the heart of geography and raises important questions, both empirical and moral, about how we live and make use of resources. Here, we can see that human agency is integral to the discipline. Although we often separate human and physical geography for pedagogical reasons (or for developing theoretical concepts) it is the connections between the different layers of the earth's surface that is specific to the geographical approach. This is especially true in today's world where few parts of the planet are untouched by human activity. However, geography is not environmental studies and so to remain within the discipline these questions need to be framed by either a spatial or area studies approach.

The value of identifying disciplinary concepts is that it informs teachers, and pupils, what they are aiming for in geography. How does one know if they are studying economics or economic geography? Economists aim for an understanding of how economies work and function, while geographers study economic activity to understand how it is arranged and connected spatially, as well as how it is related to other geographical phenomena (such as resource distribution, climate, population). Without disciplinary concepts to guide us, geographers risk straying into other subjects or non-educational aims, including the promotion of good causes such as fair trade or environmentalism (Marsden, 1999; Standish, 2007; Standish, 2009).

Beyond aims, teachers need to induct pupils into geography's methods and modes of enquiry. This means teaching them to ask and to answer questions in both spatial analysis and area/regional studies. Here, we can begin to see curricular implications arising from geography's epistemology. In each key stage of the curriculum it would benefit pupils to be following some units of work that take a systematic/spatial analysis approach and some units that focus on a particular place or region. Or, it is possible to devise units which move between both regional and systematic geography. With both approaches significant questions should also be raised about how people manage and are influenced by the environment in which they live. Continually returning to regional geography is important from a pedagogical perspective because, 'The interplay between topical (systematic) and regional perspectives is what stimulates thought' (Gersmehl, 2008: 23). Here, pupils are learning to see the connections between the theoretical and the empirical or the general and the particular.

The content of what pupils will study is provided both by geography's sub-disciplines (Figure 6) and the different areas of the earth's surface (including bodies of water). Pupils do not necessarily need to study all of geography's sub-disciplines, but in order to understand the inter-relationships between different 'layers' of the earth's surface that give rise to areal differentiation and spatial patterns, they will need to study most of these. Given that geographers integrate knowledge that is horizontally structured there is not a definitive order in which sub-disciplines should be introduced. Hirst and Peters (1974) likened the curriculum to a jigsaw puzzle. There are many different places one can start, different ways to precede and places to finish, even though every piece has a correct place. This is especially true for geography and it allows the teacher creative licence to plan a curriculum as she sees fit. However, we can also say that some layers are more significant than others in terms of shaping a distinctive geography. Rock, landforms and climate all play a dominant role in determining physical characteristics. Population, economies and culture are highly influential human layers.

To a large extent the same is true with regions and places. Pupils should be introduced to all regions of the world over the course of their schooling. This does not necessarily mean that teachers should aim to 'cover' every continent or country. Some regions and places will be covered in more depth than others and an important aspect of the regional approach is to understand the interplay between different *scales* – how places and smaller regions are connected with and contribute to larger regions and countries. There is also a compelling rationale for pupils in the early stages of school starting with where one lives (the familiar and concrete) and moving to the more distant and unfamiliar parts of the world. However, this is not an argument for only studying one's own country or continent at primary level as it will need to be explored in more depth as the pupils' knowledge grows.

Pupils also need to learn the skills and methods used by geographers such that they learn how to ask and to answer geographical questions of their own, and over time become less dependent upon the teacher. Skills that are specific to geography include how to construct, use and interpret maps, as well as Geographical Information Systems (GIS) - geographically referenced data programmes used to produce digital maps. In the early years of school, pupils must learn what a plan view is and how the real world can be represented through symbols on

plans and maps. Children must learn the meaning of directions and how they can be used for describing location and for orientation. Of course, learning to use maps involves learning many concepts including direction, distance, scale, grid reference, map symbols and contours. Pupils demonstrate skills when they learn to apply these concepts in the construction and interpretation of maps, such as identifying landforms from contour patterns or drawing the watershed (boundary) of a drainage basin.

In the modern world a young geographer also needs to learn how to use a GIS. A GIS is used to store, analyse, present and interrogate geographical data. This can be as simple as presenting a set of data points on Google-Earth to illustrate a route taken or where people live. Or, it can be more complex operations such as showing land that would be flooded by a rise in sea level. Many schools are making use of relatively cheap or even free GIS programmes such as ArcGIS (ESRI), QGIS or Digimaps (Ordnance Survey). Many geography students now learn to use a GIS at university or during their teacher training and so are well-placed to teach these in schools. And, in the age of smart phones and Pokamon Go, many pupils quickly become adept at using a GIS technology.

There are many other skills that pupils will learn that are not specific to geography. These include skills of literacy, numeracy and the scientific method. For instance, pupils need to learn how to answer geographical questions through data collection, analysis and interpretation. This means practising methods of fieldwork that are specific to both social science and natural science, such as using questionnaires, measuring the features of a river channel or analysing a soil profile. Here, pupils are learning how to conduct research in a simplified form and that this involves applying a methodology systematically to collect data in an unbiased way (Lambert and Reiss, 2014). This *procedural knowledge* also teaches pupils about the process through which knowledge is constructed and verified. Fieldwork teaches pupils that the knowledge they learn in textbooks and the classroom has been created through a process and that the real world is complex and messy.

How is geography of value to children?

The first way in which geography is of value is that it *introduces the world* to the child. It shows them what natural and human features can be found in different parts of the world. This might include the beauty of karst limestone landscape along the Lijiang River in China; the destructive power of a hurricane or a tropical storm; the amazing attire of different Kenyan tribes; unusual cultural traits such as the dietary practices of the Jain Indians, who apply non-violence to the cultivation of food; that people can thrive in extreme conditions of cold (Eskimos north of the Arctic Circle) and places that receive nearly 12 meters of rain a year (villages in the Indian state of Meghalaya). But geography is about more than the exotic. Pupils should also be introduced to the ways in which our world is being transformed, such as the economic and social transformation of China over recent decades and Europe has been changed by the European Union, and where a lack of transformation has left people living in poverty.

It is often claimed that geography is about inspiring a sense of awe and wonder in people. Indeed, generating a sense of curiosity about the world is an excellent starting point for teaching. What comes next is education – pupils must acquire the conceptual and contextual knowledge that enables them to *interpret* and to *understand* the phenomena in front of them. 'Geography is an attempt to find and impose order on a seemingly chaotic world', suggests Alistair Bonnett (2007: 6). With the acquisition of subject knowledge a young person sees the world differently – their perceptions of events and phenomena are interpreted through the concepts and facts they have learnt. Indeed, our very thoughts are structured by the concepts we have acquired. And, it is theoretical concepts and ways of thinking that enable a person to *see more*, *further*, *deeper* and to interpret new information with a sense of *perspective*.

Through the study of geography young people will also learn that the pursuit of *knowledge and truth* are worthy aims giving rise to the possibility that they will want to pursue these beyond their schooling – whether in geography or another discipline. Even if they choose not to, they will appreciate the value of learning a subject and that knowledge has value for society.

Finally, geography teaches children about *humanity* and will help them to *find their place* within it. Geography shows pupils that being human means different things in different parts of the world, that there are different ways of living, different belief systems, traditions, cultural practices and that people adapt to the challenges of diverse environments. Therefore, geographical knowledge has the potential to *liberate* young people from the limitations of their personal experience and to show them what is possible. Exposing children to human differences will hopefully enhance their *tolerance* for different people and different ways of living.

1. Strabo (7AD) *Geographica*, available: http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Strabo/home.html

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