

# THE MAKERS OF MODERN GEOGRAPHY

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Robert E. Dickinson

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SOCIAL AND CULTURAL GEOGRAPHY



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Volume 2

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MODERN GEOGRAPHY

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# **THE MAKERS OF MODERN GEOGRAPHY**

**ROBERT E. DICKINSON**

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# *The Makers of Modern Geography*

by

ROBERT E. DICKINSON



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To  
Mary

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## *Preface*

The purpose of this book is to trace the development of modern geography as an organised body of knowledge in the light of the works of its foremost German and French contributors.

Geography as an explicitly defined field of knowledge is more than two thousand years old. The writings of Ptolemy and Strabo contain clear statements of basic geographical concepts, though we should always remember (as classical scholars so often forget) that their theoretical views, like those of their successors until our own day, suffered from a lack of factual information and maps about the lands, seas, and peoples of the earth that were the subject of their writings.

With the works of the early scholars, however, I am not directly concerned. Our purpose is to trace the development of geography over the past one hundred years or more. In this period it has experienced a quite prodigious development, as is evidenced by its full recognition in Universities throughout the civilised world, and by the activities of professional societies and international organisations.

Such being the purpose of the book, I may briefly outline its contents. The founders of modern geography were by international acclaim Alexander von Humboldt and Carl Ritter in the first half of the nineteenth century. There was a period thereafter that lasted for several decades (essentially the third quarter of the century) in which the geography of Ritter was treated in both Germany and France as an adjunct of history. The subject was of wide popularity in the field of exploration and was recognised as worthy of status in the University in the last quarter of the century—a development due both to the advancement of knowledge as well as to an active phase of colonial expansion in both countries.

The first chairs were established in the last quarter of the century and their holders were thus the first generation of University geographers. The leaders were Ferdinand von Richthofen and Friedrich Ratzel.

## Preface

The second generation were students or followers of the first and their careers overlap with their teachers and their first pupils. This group includes Vidal de la Blache in France; Albrecht Penck, Alfred Hettner, Otto Schlüter and Joseph Partsch in Germany; Halford Mackinder in Britain; William Morris Davis in the United States; and Sten de Geer in Sweden. Their period of professional activity extends from the last two decades of the nineteenth century to the end of the first quarter of the twentieth century. All of them in the first part of their careers were contemporary with the elder masters, but remained at their posts for about twenty years after.

The third generation, which has many distinguished names, embraces the pupils of these men, or students who were greatly influenced by them, or, in a few cases, others who entered the professional field as what the Germans call *Autodiktaten*, that is, self-trained geographers. The period of this generation roughly fills the second quarter of this century and their most active years were between the wars. It is, indeed, convenient in many ways to regard the second and third generations as separated by the hiatus of the First World War.

The fourth generation includes the scholars who began their careers between the wars, have been leaders over the past twenty or thirty years, and are now reaching the end of their careers or are already in, or approaching, retirement.

A fifth generation includes those who since the Second World War have been actively engaged in research and now have twenty or thirty years of leadership before them. I have chosen not to select and deal with these scholars individually, but to examine the general trends of research and publication in the post-war years.

This chronological growth conditions the sequence of the chapters of the book, which, in its final draft, is limited to the German and French contributors, treated in two separate parts.

Several general comments are necessary. Geography as a University study is a hundred years old, but in both Britain and America there is widespread doubt as to what it is all about. My aim is to present to English-speaking scholars the substance of a long and respected heritage. If geography is what geographers do, let us look at the works of its great makers. This procedure must result in a certain amount of repetition, for which I offer no apologies. This fact certainly reveals the consistency of idea and purpose of its major makers. Further, I wish to state here at the outset that the consistent objective of all the outstanding makers of modern geography, European and American alike, to say nothing of Ptolemy and Strabo, is that their concern is with the regional concept, that is,

## *Preface*

with the modes of association of terrestrial phenomena as distinctive specific and generic segments of the surface of the earth. I have quite deliberately excluded all reference to the development of ancillary fields of study, be it geomorphology or geopolitics, and selected the contributors and their works in the light of their relevance to the problems and procedures of the regional concept.

Professor Ph. Pinchemel, formerly at the University of Lille, and since 1965 at the Sorbonne, and Professor F. Wilhelm at the University of Kiel, kindly presented short reports on post-war trends. Professor Carl Troll provided invaluable data on the career of Albrecht Penck. Professors Jean Gottman and André Cholley have been very helpful on questions of geography in France. Dr. Richard Hartshorne made a careful reading of the third draft, and most of his comments on detail and relevance have been followed in a draft that has radically shifted in emphasis from the field of modern geography to a series of biographies. To all these I wish to convey my warmest thanks. Responsibility, however, for every word of the text rests with me, the author. Finally, much work has been put into the preparation of this book at its different stages by my wife and the final product is an expression of gratitude for her long enduring patience and sympathetic support.

ROBERT E. DICKINSON



## *Basic References*

*The basic references on the field of geography are as follows:*

1. A. Hettner, *Die Geographie, Ihre Geschichte, Ihr Wesen und Ihre Methoden*, Breslau, 1927.
2. R. Hartshorne, *The Nature of Geography*, two volumes published in the *Annals of the Assoc. Amer. Geogrs.*, Vol. XXIX, September 1939 and December 1939, pp. 173-658. Reprinted as a single volume by the Association in 1946. Also *Perspective on the Nature of Geography*, Chicago and London, 1959. These two works are the most scholarly analysis of the field of geography in English, and probably in any language. They are based primarily on a thorough and critical survey of the European, and especially, the German contribution.
3. G. de Jong, *Chorological Differentiation as the Fundamental Principle of Geography*, Groningen, 1962.
4. G. Taylor, *Geography in the Twentieth Century*, London, 1951, is a collection of essays by some dozen authors from various countries on 'the evolution of geography', 'environment as a factor', and 'special fields'.
5. T. W. Freeman, *A Hundred Years of Geography*, London, 1961. Mainly a record of development in Britain, with very sporadic references to Continental and American contributions.

# Part One

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## THE FOUNDERS

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# 1

## From Strabo to Kant

### PTOLEMY AND STRABO

Descriptive writings of land and people are found in the oral traditions of classical Greece and are reflected in the works of Homer. A major step forward, in the realm of science, was taken by Eratosthenes at Alexandria in the third century before Christ. He not only carried out a remarkably accurate and well-known calculation of the dimensions of the earth but he also wrote a descriptive work called the *Geographica*. Although the work is no longer extant, it is known to have contained the first recorded use of the word 'geography'. The word is derived from the Greek *ge*, meaning the earth, and *grapho*, meaning I write. Geography literally means, therefore, writing about, or description of, the earth. Its practitioners since the days of Homer have written about the lands and peoples of the habited world, the Greek *ecumene*—and speculated about lands and peoples beyond the range of human knowledge.

The most complete definitions of the scope and purpose of geography now extant are contained in the works of Ptolemy and Strabo.<sup>1</sup> We conclude from their works that geography is concerned with the location and interconnections of places on the earth as a whole. Chorography deals with the integral place of all parts of a given whole as limbs are to the human body, and topography deals with the place of a discrete unit, series, or group of units. Those terms are based on the Greek word-roots *ge*, *chora*, and *topos*, meaning earth, district and place. These word-roots were redefined in the writings of Varenus in the seventeenth and Kant in the eighteenth centuries. The idea behind this conceptual framework is what Strabo described as the 'natural attributes of place' within a framework of relation to other places on the earth's surface. No matter how sophisticated modern concepts and problems become,

<sup>1</sup> F. Lukerman, 'The Concept of Location in Classical Geography,' *Annals Assn. of Amer. Geogrs.*, 51 (1961), pp. 194-210.

## *The Founders*

this is the basic and unique concepts of all geographical ideas, and it remains firmly fixed in popular parlance to this day.

The classical view of location has a double meaning—astronomical position and terrestrial position. The view of the earth as a circular land mass surrounded by a river of ocean was held by such men as Anaximander and Hecataeus of Miletus. It was denied by Herodotus and Aristotle as mythical, since it was not based on either observation or experience. Location was concerned only with the known earth, the *ecumene*. Beyond it lay the unknown, and they indulged in no speculation and certainly did not attempt to map what might be there.

Cosmography, on the other hand, considered the earth's properties that were derived from its being as a body in space. The shape, size, and divisions of the earth were thus the content of cosmography, though Strabo pointed out that cosmographical ideas in reference to the earth were basic to geographical description of its surface and the properties and interrelation of places. The division of the earth into habitable and uninhabitable sectors (whether based on heat or cold) was a cosmographical matter. Similarly, the division of the earth into five parallel zones was a cosmographical concern. This idea probably goes back to the fifth century B.C. in Greece and obviously must have been based on the idea of a spherical earth, though this concept was based on philosophical argument rather than observation. It remained to Aristotle in the fourth century B.C. to prove this sphericity on the basis of observations and deduction and for others later to calculate its dimensions. These zones, divided by the arctic and tropical circles into torrid, temperate, and frigid, were based on the projection of celestial properties on the surface of the terrestrial sphere long before the earth was actually circum-navigated.

## APIAN AND MUNSTER

From Ptolemy and Strabo we now leap across a period of more than fifteen hundred years. Geography as an organized body of knowledge made little progress in the so-called dark and middle ages. During the Renaissance classical ideas were revived and, as far as geographical knowledge was concerned, were only gradually discarded or rectified. For example, Ptolemy's map, and his calculations of latitudes and longitudes of places, affected map makers and distorted the portrayal of coastlines until the eighteenth century. Indeed, explorers were still searching for the Mountains of the Moon

## *From Strabo to Kant*

in the nineteenth century, and ideas about the distribution of land and water in the southern seas were dominated by the Ptolemaic notion of a southern continent until Captain Cook's voyages in the eighteenth century.

Brief reference must be made to Peter Apian (Petrus Apianus) and Sebastian Münster who produced two geographical works at the beginning of the Age of Discovery, which for a hundred years after their publication in the sixteenth century were the chief standard theoretical works; the one for its popular exposition of astronomy and mathematical geography and the other for its descriptive geography modelled on Strabo.

Peter Apian, who was born in Saxony in 1495, was an astronomer and cartographer. In addition to making maps and globes, he published two works, *Astronomicon caesareum*, an astronomical treatise, and *Cosmographicus liber*, which he modelled on the *Cosmographiae introductio* of Martin Waldseemüller. The *Cosmographicus liber* was first published in 1524. The book in its original form deals almost exclusively with those aspects of geometry and astronomy which are essential to geography. Latitudes and longitudes for numerous places are given, and what descriptive geography it contains was subsequently appended by Gemma Frisius who follows closely the methods and descriptions of Ptolemy.

The Ptolemaic distinction between geography and chorography is clearly stated. The earth is shown at the centre of the universe; the sun and planets revolving round it. The earth is divided (in accordance with the Aristotelian tradition) into five zones: torrid, temperate (between the tropics and polar circles), and frigid. *Climata* are defined as the spaces between parallels of latitude at intervals of a difference of half an hour in the length of their longest day, and each *climata* is named after the principal feature in it, such as a town, a river, or a mountain range. The lands are of four forms, namely islands, peninsulas, isthmuses, and continents, each illustrated by a simple diagram. Then follow diagrams of hands and feet to serve as a basis for linear measurement. A short note is given on each continent, and finally there is a long list of towns for each country, with their latitudes and longitudes taken from Johannes Schöner and Ptolemy.

Sebastian Münster is the best representative of the German geographers in the sixteenth century. Born at Ingelheim near Mainz in 1489, he studied at Heidelberg and Vienna, and in 1536 he was appointed to a chair of Hebrew at Basle, where he remained until his death in 1552. Münster made important contributions to cartography. He attempted to improve cartographic methods by using a

## The Founders

small compass, the forerunner of the prismatic compass, for a simple triangulation survey of a small area round Heidelberg.

Münster published his edition of Ptolemy at Basle in 1540 and during the next twelve years four re-editions appeared. This work was followed in 1544 by the *Cosmographia universalis* which is a compilation from many contemporary authorities rather than a carefully arranged treatise. History and genealogical tables take up a large part of the book, and mathematical and physical geography are almost excluded.

Münster takes for granted that the earth is spherical and he declares that the earth's crust suffers changes through floods and the work of rivers. His knowledge of floods in Holland caused him to declare that many lands have been flooded since the Deluge, and that mountains and valleys have been formed by rivers where the land was formerly flat. He also mentions earthquakes, the 'central fire', the character of rocks, the nature and distribution of metals, and methods of mining. The book deals primarily with human and political geography of Germany on a chorographic basis. The last part of the book deals with Asia, Africa, and the New World. All the material here is second hand, and the descriptions are much inferior to the section on Europe.

Münster was a keen observer and a good writer and his work was the standard text for more than a hundred years. 'So completely did the volume resulting from the insight, learning, and energy of Münster meet the demand of the time, and so thoroughly did it establish itself, that in enlarged form it remained in use until after 1650, going through forty-six editions and appearing in six languages.'<sup>1</sup>

## VARENIUS, CLUVERIUS, AND KANT

The successor to *Cosmographia universalis* was Bernhard Varenius' *Geographia generalis* which appeared in 1650. This work was the first which sought to combine general, mathematical, and physical geography and chorography.<sup>2</sup>

<sup>1</sup> Allan H. Gilbert, 'Pierre Davity: His Geography and its use by Milton', *Geog. Rev.*, 7 (1919), pp. 322-38; reference on p. 325.

<sup>2</sup> An appraisal of the works of Varenius was presented by J. N. L. Baker in 1955 in the *Transactions of the Institute of British Geographers*. This is reproduced in *The History of Geography*, Oxford and New York, 1963, pp. 105-118. Varenius' *Descriptio regni Japonicae et Siam* was published in 1649 at Amsterdam and in 1673 in London. The *Geographia generalis* was first published in 1650. Two editions, edited by Sir Isaac Newton, were printed in Latin in Cambridge in 1672

## *From Strabo to Kant*

Bernhard Varenus was born in 1622 at Hitzacker, a small town on the Elbe near Hamburg. In 1640 he entered the gymnasium at Hamburg and studied philosophy, mathematics, and physics. After three years he went to the university at Königsberg to study medicine but, dissatisfied with the teaching, he moved to Leiden to pursue the same work. In 1649 he published his first book on the geography and history of Japan which is an excellent descriptive compilation in view of the limited material at his disposal. This was immediately followed by a companion volume on the religion of Japan. In August, 1650, he published *Geographia generalis*, which was written between the autumn of 1649 and spring of 1650. The work should undoubtedly have been followed by a second volume, but it remained unfinished owing to his premature death, at the age of twenty-eight, in 1650.

The full title of an early translation of Varenus' geography is *A Complete System of General Geography: Explaining the Nature and Properties of the Earth . . . Originally Written in Latin by Bernhard Varenus, M.D., Since Improved and Illustrated by Sir Isaac Newton and Dr. Jurin; And now Translated into English . . . by Mr. Dugdale. The Whole Revised and Corrected by Peter Shaw*. A long subtitle describes 'The Nature and Properties of the Earth' as follows:

Its Figure, Magnitude, Motions, Situation, Contents, and Division into Land and Water, Mountains, Woods, Deserts, Lakes, Rivers, etc.

With particular Accounts of the different Appearance of the Heavens in different Countries; the Seasons of the Year over all the Globe; the Tides of the Sea; Bays, Capes, Islands, Rocks, Sand-Banks, and Shelves. The State of the Atmosphere; the Nature of Exhalations; Storms, Tornados, etc.

The Origin of Springs, Mineral Waters, Burning Mountains, Mines, etc.

The Uses and Making of Maps, Globes, and Sea Charts.

The Foundations of *Dialling*; the Art of *Measuring Heights and Distances*; the Art of Ship-Building, *Navigation*, and the Ways of *Finding the Longitude at Sea*.

Although Varenus was hindered by lack of material, his ideas

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and 1681 respectively. The first English translation by Blome dates from 1693. Another edition with J. Jurin as editor appeared in 1712. The Jurin edition was further edited by Dugdale and Shaw and appeared in 1736. It contained amendments and additional footnotes. The fourth, and last, English-language edition was published in 1765. This is the edition quoted here as indicative of the level of geographical knowledge in the middle of the eighteenth century.



## *The Founders*

were far in advance of the knowledge of his time. He defines geography as follows:

Geography is that part of *mixed Mathematics*, which explains the State of the Earth, and of its Parts, depending on Quantity, viz. its Figure, Place, Magnitude, and Motion, with the Celestial Appearances, etc. By some it is taken in too limited a Sense, for a bare Description of the several Countries; and by others too extensively, who along with such a Description would have their Political Constitution.

Geography is divided into two divisions, general or universal and special or particular.

We call that *Universal Geography* which considers the whole Earth in general, and explains its Properties without regard to particular Countries: But *Special* or *Particular Geography*, describes the Constitution and Situation of each single country by itself which is twofold, viz. *Chorographical*, which describes Countries of a considerable Extent; or *Topographical*, which gives a View of some place or small Tract of the Earth.

General or universal Geography is divided into three parts: the absolute part which deals with the form, dimensions, and position of the earth, as well as the distribution of land and water, mountains, woods, deserts, and hydrography and the atmosphere; the relative part which deals with the 'Appearances and Accidents that happen to (the earth) from Celestial Causes', that is latitude, climatic zones, longitude, and so forth; and the comparative part which contains 'an explication of those Properties, which arise from comparing different Parts of the Earth together'.

Special Geography, though not dealt with in detail, is outlined under three 'particulars or occurrences'. The 'Celestial Properties are such as affect us by reason of the apparent Motion of the Sun and Stars'. Terrestrial properties are those which 'are observed in the Face of every Country' and include location, shape, magnitude, topography, hydrography, vegetation, fertility, minerals and soils, animals, and longitude. Human properties concern 'the inhabitants of the place' and again fall into ten categories, as follows:

1. Their Stature, Shape, Colour, and the length of their Lives; their Origin, Meat, and Drink.
2. Their Arts, and the Profits which arise from them; with the Merchandise and Wares they barter with one another.
3. Their Virtues and Vices, Learning, Capacities, and Schools.
4. Their Ceremonies at Births, Marriages, and Funerals.
5. The Language which the Inhabitants use.
6. Their

## *From Strabo to Kant*

Political Government. 7. Their Religion and Church Government. 8. Their Cities and famous Places. 9. Their remarkable Histories. 10. Their famous Men, Artificers, and the Inventions, of the Natives.

Varenius complained that special geography was always taught at the expense of general, and on this account he argued that geography scarcely merited the dignity of a science. In special geography features should be explained in terms of general laws, so as to make local geography logical and intelligible. It is therefore not surprising that in his book on Japan, which is special geography, there is a close correspondence of topics with the divisions of general geography.

A few years before the publication of Varenius' book, two other works were published, one by the German Philip Cluverius (Cluver)<sup>1</sup> and the other by Nathaniel Carpenter, an Englishman.<sup>2</sup> I confine attention to the first.

Cluverius (1580–1622) who travelled widely in Europe approached geography through the classics and history. His general work, *Introductio in Universam Geographiam* was published posthumously in 1624. This work preserves the traditional distinction between geography and chorography. Of the six books in the volume, only one deals with the earth in general, while the remaining five contain brief descriptions of countries in which the human and historical elements are stressed. The general geography is decidedly inferior to that of Varenius. Cluverius does not know the views of Copernicus; for him, the earth remains the centre of the universe. His mathematical geography and astronomy show no advance on the work of Apian written a century earlier, and physical geography is limited to the distribution of land and water. Cluverius thus concentrates on the description of countries, which are described generally in terms of their name, extent, and nature of the land and its products and the ancient and modern political divisions, ethnography, and topography.

The Ptolemaic definitions of geography, chorography, and topography are given. There follow statements of the astronomical zones,

<sup>1</sup> P. Cluverius, *Introductio in Universam Geographiam*. The bulk of this work was translated for the present writer from the Latin version in the British Museum by the late M. T. Smiley, Professor of Latin and Greek at University College, London, in 1932. This is the first opportunity I have had to express in print the thanks of a young man to a senior and respected colleague.

<sup>2</sup> J. N. L. Baker, 'Nathaniel Carpenter and English Geography in the seventeenth Century', *Geographical Journal*, 71, (1928) pp. 261–71, reprinted in *The History of Geography*, Oxford, 1963.

## *The Founders*

great circles, zodiac, meridians, minor circles, parallels and climate, cardinal points, divisions into 360 degrees and measurements of distances, the ocean and its divisions, the great inlets of the ocean, the inner sea (that is, the Mediterranean), navigation, and a summary division of the whole world.

The method of description for a country may be illustrated by the British Isles, which are briefly portrayed as to location and extent. Tribal units, countries, and the inhabitants (mainly referring to the Roman occupation) are described, and this is followed by short sections on England, Scotland, and Ireland. The section on Ireland reads as follows:

What peoples were the first to inhabit it is uncertain, except that like the rest of the Britons, they were of Celtic stock. The Brigantes, Cauai, and Menapii, whom Ptolemy mentions as in it, very probably crossed thither from Gaul, Britain, and Germany. Today its chief division is into four districts. There are thirty-three counties in the whole kingdom. It would be more correct to say that the Irish live in small towns than in cities.

It has such an abundance of grass, that is rich and sweet, that cattle take but a small part of a day to fill themselves; and unless they are kept from the fodder, they go on grazing and burst asunder. Its population is uncouth, and a stranger to all virtues, to a greater degree than other races.

The works of Cluverius and Varenus were standard until the middle of the eighteenth century and bring us to the threshold of the development of modern geography as a discipline.

Immanuel Kant (1724–1804), the philosopher, lectured on physical geography in the University of Königsberg from 1765, and his lectures were subsequently published.<sup>1</sup> In his view the human element was an integral part of the subject matter of geography. Kant divided the communication of experience between persons into two branches, narrative or historical, and descriptive or geographical;

<sup>1</sup> D. F. T. Rink, *Kant's Physische Geographie*, 1802. Kant's *Gesammelte Schriften*, Bank IX, 1802 Berlin, 1923. G. Gerland, 'Immanuel Kant, seine geographischen und anthropologischen Arbeiten,' *Kant Studien*, 19 (1905), pp. 417–547. E. Adickes, *Kant's Ansichten über Geschichte und Bau der Erde*, Tübingen, 1911; *Untersuchungen zu Kant's physischer Geographie*, Tübingen, 1911; and *Ein neu aufgefundenes Kollegheft nach Kant's Vorlesung über physische Geographie*, Tübingen, 1913. The works by Adickes are reviewed by O. Schlüter in the *Geog. Zeit.*, 19 (1913) and 20 (1914). See also an important discussion of Kant's geographical ideas in Hartshorne's *The Nature of Geography*, especially pp. 38–44. Also G. Taylor (ed.) *Geography in the Twentieth Century*, 1951, containing G. Tatham's essay on pp. 38–42.

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and he regarded both history and geography as descriptions, the former in time and the latter in space. He claimed physical geography to be 'a summary of nature', the basis not only of history but also of 'all the other possible geographies'. Five of the other geographies he identified as part of physical geography are mathematical (the form, size, and movement of the earth and its place in the solar system), moral (the customs and character of man in relation to environment), political, mercantile (commercial), and theological (the distribution of religions). Physical geography thus embraced the outer physical world, the earth's surface, and its cover of life forms of plants, animals, and man and his works.

Kant followed essentially the Ptolemaic definitions of geography. However, there was an essential difference between his work and that of the classical scholars. The latter laid primary emphasis on the areal divisions of the earth and the business of systematically describing their distinctive content. Kant, on the other hand, was not so much concerned with composite terrestrial units of different orders, but with the orderly investigation of particular areally differentiated phenomena. Both are integral aspects of the areal differentiations of the earth's surface, but out of the difference of emphasis that is reflected in the works of Ptolemy and Strabo on the one hand and Kant and Varenius on the other emerges differences of approach that run throughout the development of modern geography.

These differences of approach have been recently described as the theoretical (deductive) or nomothetic approach and the empirical (descriptive) approach. The theoretical approach seeks to establish theories relevant to the location and interrelations of places and to establish laws and make deductions on the basis of the laws. The empirical or ideographic approach places primary emphasis on the description of particular groupings of nations and people in terms of lands, seas, countries, and places. It does not seek to develop laws but to find out how phenomena account for the *genus loci*, the character of a place and its relations with other places. These are the two basic approaches and traditions in all geographical inquiry and their contrast and conflict have become more marked and difficult to bridge as knowledge of the surface of the earth has increased.

## NATURE V. MAN: THE WORK OF BUFFON

At the opening of the nineteenth century, there was concern with the distinctive concepts and procedures of the study of geography as an organized body of knowledge. Three matters need special attention:

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first, the modes of collation and interpretation of the data relevant to the earth's surface and the life forms upon it, taking the colossal work of Count Buffon as a major indicator; second, the problems, both theoretical and applied, of defining areal units as a basis for description of areas; and, third, the content of standard geographies published about this time that reveal not only the scope and methods of geographical writing, but also the status of knowledge of the earth's surface and its differentiated parts.

By the end of the eighteenth century there was gradually emerging a theory which favoured the slow operation of natural laws as opposed to the cataclysmic events occurring through divine intervention. At that time both beliefs were largely theoretical. In the early nineteenth century, however, the evidence in favour of the slow operation of natural laws was collected and their overwhelming impact came in the 1860's.

The problem of developing scientific methods for the study of the life forms also received attention in the late eighteenth century. The passion for the scientific collection of specimens on voyages of exploration resulted in remarkable assemblages such as the flora brought back by the botanists on Cook's voyages of discovery. The task of classification and description of flora and fauna was also undertaken. Leibnitz and Buffon tried to arrange all life forms in a scale from the simplest organisms to the most complex. Linnaeus, on the other hand, arranged all life forms into taxonomic groupings.

The question of the nature and growth of civilization drew the attention of many thinkers. Theories of the progress of mankind involved some speculation on the role of the physical environment as a stimulant or deterrent. Buffon and others were concerned with the question of the unity of the human race and the manner of its dispersion over the entire world. This belief in the unity of the human race required explanation of the diversity of man and his uneven distribution over the earth and asked questions about the relation between population density and productivity.

All these trends are clearly reflected in the voluminous *Histoire naturelle, générale et particulière* by Georges-Louis Leclerc, Comte de Buffon (1707-88). The *Histoire naturelle* is in forty-four volumes published between 1749 and 1804. It was completed after Buffon's death by La Cépède.

Clarence Glacken<sup>1</sup> has evaluated Buffon's work as follows: 'The *Histoire naturelle* satisfied a hunger for concrete and detailed knowledge that was not dependent on mathematics or Cartesian deductive

<sup>1</sup> C. J. Glacken, 'Count Buffon on Cultural Changes of the Physical Environment,' *Annals Ass. Amer. Geogs.*, 50 (1960), pp. 1-21.

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reasoning, but on study, travel, observation, and description.' This offers a background for understanding the philosophical views of scientific developments in this remarkable era, that was marked by a prodigious enthusiasm for exploration, travel, and the collection of data about the earth, its plants and fauna, and its primitive societies.

While covering the whole realm of nature, Buffon makes repeated reference to the relations between man and his environment. He refers to the changes which man has made in his natural environment, and particularly to the transformations which have accompanied the growth and expansion of civilization and the migration and dispersion of human beings and their domesticated plants and animals throughout the habitable parts of the earth. This is the main theme of *Des époques de la nature*, whose title refers to the seven periods of the earth's history: 'the formation of the earth and the planets, the consolidation of the rock in the interior of the earth, the invasion of the continents by the seas, the retreat of the seas and the beginning of volcanic activity, the north as the habitat of elephants and other animals of the south, the separation of the continents, and the power of man aiding that of nature.' It is in this last phase that Buffon draws attention to the relationship between man and nature. He envisages Central Asia between 40° and 55° as the seat of the earliest civilizations, which had developed thirty centuries before in an environment of pleasant climate and fertile soil, sheltered from floods and free from earthquakes. There civilized man first attained knowledge, science, and power. But this civilization was destroyed by people from the north who were driven out of their homeland by overpopulation. Although much of the early civilization was lost, agriculture and building techniques survived and were diffused into China, Atlantis, Egypt, Rome and Europe. In the succeeding centuries man continued to progress, and Buffon was able to conclude:

The entire face of the Earth bears today the stamp of the power of man, which although subordinate to that of Nature, often has done more than she, or at least has so marvellously aided her, that it is with the help of our hands that she has developed to her full extent and that she has gradually arrived at the point of perfection and of magnificence in which we see her today.<sup>1</sup>

Buffon clearly believed in the creative power of man. As an agronomist, he wrote much about forest clearance and the need for conservation. He developed the theme that by changes of the landscape—forest clearance and drainage in particular—the climate became warmer. He speculated on climatic change and suggested

<sup>1</sup> C. J. Glacken, *op cit.* p. 10.

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that the removal of forests and the drainage of marshes might lead to temperature increases. On the other hand, he urged the conservation of forests. Glacken summarizes Buffon's position by saying 'large areas inimical to man had to be cleared, . . . but once societies were established on them, the forests were resources which had to be treated with care and foresight.'

Buffon was one of the early writers on soils. These he grouped into clays, calcareous earths, and vegetable earths, the last falling into two forms, the *terrean* (leaf mould) and the *limon*, which is the residue in the decomposition of the *terrean*.

He also wrote at length on domesticated animals and plants and made frequent shrewd comments on landscape, especially the contrasts between the habited and uninhabited land. Glacken presents Buffon's viewpoint:<sup>1</sup>

Among countries inhabited for a long time, there are few woods, lakes, or marshes, but they have many heaths and shrubs (meaning no doubt that heaths and shrub take over deforested and barren mountain tops). Men destroy, drain, and in time give a totally different appearance to the face of the earth.

## THE REGIONAL CONCEPT AROUND 1800: PURE GEOGRAPHY<sup>2</sup>

Geographies before the mid-eighteenth century were utilitarian encyclopedic compilations, without orderly presentation or general principles of areal distribution and with reference only to existing political units. Europe, the best known and most fully described part of the world, was at that time divided into a crazy interlocking mosaic of political divisions with impermanent boundaries which could not possibly be used as a rational basis for description.

The new ideas of geographic description were primarily due to German writers. This was certainly owing to the fact that there were some four hundred political divisions in the German-speaking part of Europe. At the same time these German writers were trying to decide

<sup>1</sup> C. J. Clacken, *op cit.* p. 19.

<sup>2</sup> The main reference in English to the period around 1800 is Hartshorne's *The Nature of Geography*, pp. 211-24 (35-48). Ernst Plewe discusses the life and work of A. F. Büsching in an essay in the Hermann Lautensach Festschrift, *Stuttgarter Geog. Studien*, Band 69, ed. H. Wilhelmy, 1957. A main source in Germany is E. Wisotski *Zeitströmungen in der Geographie*, Leipzig, 1897. There is also a brief, but useful, discussion and bibliography in K. Bürger, *Der Landschaftsbegriff: Ein Beitrag zur geographischen Auffassung*, *Dresdner Geog. Studien*, Heft 7 (1935).

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just what the historical term *Deutschland* meant—politically, culturally, and linguistically—as a geographical term. Out of the resulting difficulties of descriptive presentation, there emerged interest in *reine Geographie* or pure geography. This meant the use of natural, or physical, land units instead of political units as a basis for description of both land and people. The two kinds of study were called *Länderkunde* and *Staatenkunde* respectively.

Anton Friedrich Busching wrote the *Neue Erdbeschreibung* (eleven parts; 1754–92) in which he sought to provide ‘a description of the known surface of the earth’, but he used political units as his regional base, and his presentation did not differ from the many other works based on the pattern of Strabo.

A new kind of natural division of both lands and seas, however, was proclaimed by the French scholar, Philippe Buache in 1756 in his *Essai de géographie physique*. Basing his theories on a 1737 bathymetric survey of the English Channel, he postulated that the earth was divided into drainage basins by mountain ranges. This speculation was based on limited knowledge of Europe and dismal ignorance of both the surface configuration of the continents and of the ocean floors. Buache recognized three categories of mountains: the highest ranges which are oriented from west to east or north to south; the medium size ranges that are branches of the highest and which separate the main river basins from each other; and the low ranges which are branches of the medium and the source of shorter streams. In similar fashion, he envisaged the seas as divided into three oceans and two arctic seas (the southern sea being purely hypothetical and, of course, incorrect). Each of the three main oceans (Atlantic, Pacific, and Indian) is divided into basins by underwater ridges.

This idea of the natural division of the earth long remained in favour. It was taken up by a German, Johann Christoph Gatterer, in his *Abriss der Erdbeschreibung* in 1775. However, the bulk of his description is still based on political units. Gatterer’s geography embraced countries and their boundaries (*Länderkunde*), political states (*Staatenkunde*), and human and ethnic groups (*Völkerkunde*). He divided Europe into west and east. Western Europe, called *germanische Europa*, he divided by the Pyrenees and the Alps, and by the Baltic Sea and the *Britische Meer*, into four divisions. These divisions are the Pyrenean peninsula (Spain and Portugal); the Alpine Lands (West Alps and France, South Alps and Italy, North Alps and Switzerland, Germany, and Netherlands); the British Isles; the Baltic Lands which included all of Scandinavia and Prussia. He included all the remaining lands of Europe in eastern



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Europe—Russia, Hungary, and Turkey. These groupings of states Gatterer claims to have based on ‘natural divisions’, but the boundaries remain those of political states.

We may also note here that Gatterer defined geography as ‘the description of the earth as a portrayal of the earth’s surface, what it is and what Man has sought to make of it; a description of the heavens, the earth, and their influences upon each other.’ Of special interest to him was: ‘the practical and historical description of the earth that is concerned with the earth as the home of man’.

The idea of the natural division of the earth’s surface was developed by others in this period. H. G. Hommeyer wrote a work on the military geography of the European States (*Beiträge Zur Militärgeographie der europäischen Staaten*) in 1805. He complained that his contemporaries treated topographic description on the basis of political units. Hommeyer argued that political units were only an incidental part of the training and need of the military officer, whose primary concern was with the natural conditions of the earth as the theatre of war.

Among these writers we find the beginnings of the concept not only of major ‘natural divisions’, but also of a hierarchy of divisions within the major units. Hommeyer, for example, envisaged four orders of geographical unit. The locality or *Ort* is the smallest geographical unit. The district or *Gegend* is the land area visible from a high vantage point. The region or *Landschaft* is ‘the area visible from a very high vantage point’, and is ‘a number of districts that are contiguous and clearly separated from neighbouring groups of districts, chiefly demarcated by mountains and forests’. The fourth and largest unit is the *Land* which is a part of the earth’s surface bounded by the general arrangement of drainage, and is of such a size that ‘the localities and the districts and the limited changes associated with them have little influence on the location or the orientation of the ranges of the *Land*’.

Other German writers of this period also believed that geographical study should have its basis in natural rather than in political units. We should note in particular the work of Johann August Zeune, the predecessor of Ritter in the chair of geography at Berlin. In his book, *Gea: Versuch einer wissenschaftlichen Erdbeschreibung*, which was published in 1808, Zeune discarded the changing ‘mosaic of the political States’ and turned to the lasting base of the physical earth. He referred to the work of Gatterer, but his view apparently *excluded the work of man*. He divided Europe into its major divisions. Southern Europe falls into three units—the Pyrenean, Alpine, and Balkan peninsulas. *Mitteleuropa* covers the