CARL RITTER'S EARLY GEOGRAPHIC THOUGHT

( 1779 - 1817 )

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in the
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by

WALTER ERIC BOETTCHER

University College London

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The German geographer Carl Ritter (1779-1859) created a new geographical science by applying the logical structure of eighteenth-century German educational psychology to the encyclopedic body of existing geographical knowledge. He expanded the domain of Geography by including physical deterministic forces to explain cultural variation, and applied historical linguistic analysis to derive useful information from classical, medievel and contemporary geographic texts. His general comparative methodology is not well understood by geographers today because his logical diction is unfamiliar. His scientific vocabulary is adopted from eighteenth-century theories of knowledge (Erkenntnistheorie), especially brightness theory (Helligkeitstheorie). The sources of Ritter’s pedagogic and scientific thought include: the Salzmann Institute in Schnepfenthal where he was educated in accordance with the principles of Rousseau and Basedow; Halle University where he studied Kantian logic, Leibniz-Wolffian aesthetics, and the new logical foundations of natural science, philology and pedagogy; and his own independent study as a private tutor in Frankfurt-am-Main where he deepened his knowledge of science and pedagogy by discussions with many eminent scientists and pedagogues. His meetings with J.H. Pestalozzi and Alexander von Humboldt in 1807 were crucial to his intellectual development, for von Humboldt endorsed his attempt to adopt the theory behind Pestalozzi’s method as a new logical basis for Geography. This indirectly owed much to Fichte’s philosophy of science. In Göttingen during the wars of liberation, Ritter formulated his new system as a contribution to the revival of German national identity (Volksaufklärung). This culminated in 1817 in the first volume of Die Erdkunde which was applauded throughout Germany and led to the establishment of Geography as a legitimate academic discipline. He received joint appointments to the faculties of the War College and University of Berlin where he became the first Professor of Geography.
Dedicated to

Professor Emeritus George W. Hoffman

A much respected and trusted teacher, advisor and friend.
PREFACE

The numerous people and sources of help for the preparation of this thesis should be enumerated in detail both to acknowledge debts of gratitude and to indicate the range of materials and expertise consulted for this study. The British Library is acknowledged as my chief source of late-eighteenth and early-nineteenth century German publications that form the backbone of this study. Early assistance in developing the concept of the study was provided by Mr David Wileman who guided me through the excellent collection of nineteenth-century German geographic journals in the library of the Royal Geographic Society (RGS) and allowed me to photocopy Gustav Kramer's biography of Ritter. The archivist Mrs Christine Kelly made Carl Ritter's correspondence with the RGS available to me at a later date. Frau Eva Lauble at the Universitätsbibliothek Freiburg also provided early assistance by photocopying the card catalogue of the Ritter archives. Later assistance was provided by Dr Arnold who authorized my visit to the archives and Frau Spieß who helped me decipher some passages from Ritter’s notebooks. Frau Corinna Haager provided me photocopies of selected letters and accommodation was arranged by H.J. Rosner from the Institut für Physische Geographie. At the Geographisches Institut of the Universität Heidelberg Professor Arnold Scheuerbrandt provided early guidance and copies of early articles by the late Professor Ernst Plewe. Special thanks to Frau Scheuerbrandt for providing accommodation at very short notice. Additional insights about Plewe’s historical studies were provided by Dr Ute Wardenga in Münster who also arranged my valuable meeting with Professor Manfred Büttner in Bochum. The most influential source of direction at an early stage of this thesis was Professor Dietrich Denecke in Göttingen who supported my plan to limit my study of Ritter to the early works and arranged my week-long visit to the library in Göttingen. Special thanks go to the members of his industrious and spirited family whose kindness made my stay very memorable.

In East Germany I must acknowledge the help of Professor Max Linke in arranging my visits to Halle, Quedlinburg, Schnepfenthal and East Berlin. Without his experience and the support of his colleagues in Halle, I would have accomplished much less in the course of my visit. Special thanks to Dr Siegfried Kirschke for the articles he provided and the information he shared about certain taxonomic and philosophical problems. In Quedlinburg, Frau Wagner and her staff supplied notebooks and diaries from the Ritter archives which form an important part of this study. In
Berlin, the director of the archives of the Akademie der Wissenschaften der DDR, Dr Wolfgang Knobloch, provided me with correspondence between Ritter and Schelling and photocopies of a few crucial pages from Schelling’s calendar for October-November 1812. Also helpful was Dr Hans-Erich Teitge of the Deutsche Staatsbibliothek who deciphered water-damaged correspondence between Blumenbach and Ritter. The deepest debt of gratitude is owed to Herm Wolfgang Pfauch in Schnepfenthal. Whatever excellence is found in Chapter III of this study is owed directly to two days of intensive discussion with Herm Pfauch whose own scholarship and selfless assistance should be a model of academic practice. In addition to academic records, the library at the Salzmann Institut in Schnepfenthal holds an amazing array of books about pedagogy and natural science from the late eighteenth-century.

Financial assistance for my period of study in London and for support of numerous excursions to Germany comes from a variety of sources. The Committee of Vice-Chancellors and Principals of British Universities provided me with considerable tuition assistance which made my study in London possible. I am also indebted to the German Academic Exchange (DAAD) for their funding of a period of intensive language training at the Goethe Institut in Schwäbisch Hall, West Germany and an associated archival visit to Freiburg. The Central Research Fund of the University of London provided funding for visits to the various archives in East Germany and to Universität Göttingen. This led to the discovery of supporting documents for the central theme of my thesis. The remainder of my costs were met by participation in the U.S. Federally Insured Student Loan Program as administered through the Texas Higher Education Authority. Acknowledgement of financial help must go to Edward and Rae Triggs in Austin, my wife Teal Triggs who sacrificed her own study time to undertake part-time work here in London, and to my parents Walter and Reverend Sophia Boettcher. In Germany special thanks is owed to Frau Inge Amen in Osnabrück who assisted me greatly in arranging visits to Berlin and Göttingen and to whom I am greatly indebted for whatever German cultural insights I might possess.

Final acknowledgements must be made to the numerous people in London who contributed to the study. These include Dr Christiana Rahner and Mr Tassilo Herrschel who assisted me in deciphering German handwriting, interpreting and translating difficult philosophical passages, and in the final proofreading. I am also
indebted to Miss Lily Kong who also assisted by proofreading the introductory chapters. Ideas and moral support came from Dr Peter Jackson, Dr Jacquie Burgess, Dr Audrey Kobayashi, Professor Fred Luškermann and Mr Tim McFarland. Valuable suggestions and vital information came from Professor Hanno Beck in Bonn, Dr Barry Nisbet in Cambridge, Professor Geoffrey Martin in Connecticut, and Professor Terry Jordan in Texas. A continuing debt is owed to Professor Emeritus George Hoffman who provided many letters of recommendation and introductions, and who is responsible for my introduction to geography. This study also bears the imprint of my supervisor Mr Hugh Prince whose uncompromising commitment to the historical context of ideas and motivations added an indispensable dimension to an otherwise highly rationalistic work.

The convention I adopted for providing translations of the many German phrases and quotations included in the text is my own. I felt that the translations were very important in view of the limited number of Anglo-American geographers who are comfortable with German, especially early nineteenth-century German printed in Gothic script. The translations are perhaps better characterized as transliterations. In this way I hoped to restrict my interpretation to that which is expounded explicitly in the text. In some instances this produced some awkwardness or terseness in phraseology. The translations offered in the appendices were not subjected rigorously to this same approach. Whatever deficiencies exist in translation are well outweighed by the benefits of fresh material for systematic criticism by Anglo-American historians of science and geography.

Walter E. Boettcher
London, October 13, 1990
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Preface</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Table of Contents</strong></td>
<td>7</td>
</tr>
<tr>
<td><strong>List of Figures</strong></td>
<td>12</td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td></td>
</tr>
<tr>
<td><strong>The Development of Ritter's Early Ideas on the Nature of Geography</strong></td>
<td>14</td>
</tr>
<tr>
<td><strong>I. The Formative Years in Ritter's Thought</strong></td>
<td>20</td>
</tr>
<tr>
<td>A. The Conventional Wisdom of the Anglo-American School</td>
<td>24</td>
</tr>
<tr>
<td>B. General Comparative Geography and the Plewe-Beck Debate</td>
<td>28</td>
</tr>
<tr>
<td>1. The Substance of the Debate</td>
<td>31</td>
</tr>
<tr>
<td>2. The Plewe-Thesis 1959</td>
<td>33</td>
</tr>
<tr>
<td>3. The Beck Critique and Definition 1979</td>
<td>34</td>
</tr>
<tr>
<td>4. Plewe's Response 1981</td>
<td>37</td>
</tr>
<tr>
<td><strong>II. The Great Chain of Being, Stepwise Progression and General...</strong></td>
<td>39</td>
</tr>
<tr>
<td>A. The Chain of Being: Continuity in Natural Science and Psychology</td>
<td>40</td>
</tr>
<tr>
<td>1. The Leibnizian Chain</td>
<td>42</td>
</tr>
<tr>
<td>2. Helligkeitstheorie--The Process of Knowledge</td>
<td>43</td>
</tr>
<tr>
<td>B. Basedow (1723 - 1790)</td>
<td>44</td>
</tr>
<tr>
<td>1. Basedow's Erkenntnistheorie</td>
<td>46</td>
</tr>
<tr>
<td>2. Basedow's Concept of Continuity in Nature</td>
<td>50</td>
</tr>
</tbody>
</table>
III. PIETISM AND CARL RITTER'S EARLY YEARS

A. Quedlinburg (1779-1785): Lineage and Kinship

B. Schnepfenthal (1785-1796): Pietistic Patriarchs and Enlightened Education

C. Salzmann (1744-1811): Physicotheology and Pedagogy
   1. Physicotheological Elements
   2. Pedagogic Theory

D. GutsMuths (1759-1839): Physical Education and Geography

E. The Decision to Study at Halle

IV. HALLE: THE LOGICAL FOUNDATIONS OF KNOWLEDGE, PEDAGOGY AND EIGHTEENTH-CENTURY GEOGRAPHY (1796-98)

A. Niemeyer (1754-1828): Practical Pedagogy

B. First Academic Semester (Autumn/Winter 1796-7)
   1. Eberhard (1739-1809): Leibniz-Wolffian Aesthetics
   2. Jakob (1759-1827): Kant's Critical Philosophy
      a. The Vocabulary of Jakob's Kantian Logic
      b. Holism and the Principle of Continuity
   3. Sprengel (1746-1803): History and Statistics

C. Second Academic Semester (Summer 1797)
   1. Gren (1760-1798): Kantian Logic and Dynamism
      a. Chemistry and Holistic Systems
      b. Natural History and Continuity

D. Third Academic Semester (Autumn/Winter 1797-98)
   1. Wolf (1759-1824): Classicism, Philology and the Critical Interpretation of Language

E. Final Academic Semester (Spring/Summer 1798)
V. CARL RITTER'S PEDAGOGIC DEVELOPMENT:
FRANKFURT-AM-MAIN, 1798-1806 98

A. Frankfurt-Am-Main: an Enlightened City 98

B. Carl Ritter's Pedagogic Circle 100
   1. Hufnagel (1754-1830): Reform and the Mustershule 101
   2. Ritter's Earliest Knowledge of Pestalozzi 104
   3. Carl Ritter's Pedagogic Practice and Ideas 105

C. Horstig (1763-1835): Pedagogy and Aesthetic Holism 109

D. A Note Concerning Instruction in Drawing, 1802 112

E. Ebel (1764-1830): Geography & Environmental Determinism 117

F. Carl Ritter's *Europa*, 1804-7 122
   1. The Reception of *Europa* 126
   2. Sources of Methodological Ideas 128

VI. CARL RITTER'S SCIENTIFIC DEVELOPMENT:
FRANKFURT-AM-MAIN: 1798-1806 129

A. Blumenbach (1752-1840): Variation, Environmental Determinism and Taxonomy 130
   1. Species and Degeneration 131
   2. Taxonomic Problems 133
   3. Göttingen and Travelling Scientists 134

B. Sömmering (1755-1828): Polygenetic Theory and the Chain 136

C. Freiesleben (1774-1846): Mineralogy and Synthetic Comparison 142

D. Heim (1741-1819): Geology and Analytic Comparison 146

E. Ritter's *Six Charts of Europa with Explanatory Text*, 1806 152
   1. The Mountain System 155
   2. The Plant Kingdom 157
VIII. GÖTTINGEN AND THE ERDKUNDE: 1813-1817 223

A. Ritter’s Review of Geographical Literature 226

B. The Hausmann-Schrader Lectures 228

C. The Method and Plan of the *Erdkunde* 233
   1. The Plan of the Work 235
   2. The Method of Ordering 238
   3. The Sources for the *Erdkunde* 242

D. The Reception of the *Erdkunde* in Germany 246
   1. The Nationalist Component 250
   2. Teleology and Methodology
   3. Ritter’s Rejection of Watershed Theory 255

EPILOGUE 258
   Agenda for Further Research 263

BIBLIOGRAPHY 267

APPENDIX I

Translation of the preface to *Europa, ein geographisches-historisch-statistisches Gemälde*. Volume I, 1804. 303

APPENDIX II

Translation of "Some Remarks Concerning the Methods of Instruction in Geography," 1806. 310
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontispiece</td>
<td>Middle Germany in Ritter's Early Years</td>
<td>13</td>
</tr>
<tr>
<td>1-1</td>
<td>Ritter's Early Intellectual Influences</td>
<td>21</td>
</tr>
<tr>
<td>1-2</td>
<td>Title Page to the <em>Erdkunde</em></td>
<td>30</td>
</tr>
<tr>
<td>2-1</td>
<td>Leibnizian Structure of Knowledge</td>
<td>45</td>
</tr>
<tr>
<td>3-1</td>
<td>Carl Ritter as a Youth</td>
<td>66</td>
</tr>
<tr>
<td>4-1</td>
<td>Ritter’s Notes for Jakob’s Logic</td>
<td>80</td>
</tr>
<tr>
<td>5-1</td>
<td>Ritter’s Daily Schedule, c. 1800</td>
<td>107</td>
</tr>
<tr>
<td>6-1</td>
<td>Ritter’s Classification of Nationalities</td>
<td>166</td>
</tr>
<tr>
<td>6-2</td>
<td>Ritter’s Schemata of Sciences</td>
<td>170</td>
</tr>
<tr>
<td>6-3</td>
<td>Kant’s Theory of Knowledge</td>
<td>173</td>
</tr>
<tr>
<td>6-4</td>
<td>Ritter’s Structure of Geography</td>
<td>176</td>
</tr>
<tr>
<td>6-5</td>
<td>Ritter’s Geographic Pedagogy</td>
<td>177</td>
</tr>
<tr>
<td>7-1</td>
<td>Ritter’s Interpretation of Pestalozzi</td>
<td>196</td>
</tr>
<tr>
<td>8-1</td>
<td>Outline of Contents to Volume I of <em>Erdkunde</em></td>
<td>236</td>
</tr>
<tr>
<td>8-2</td>
<td>Directory to the <em>Erdkunde</em>, 1817-1859</td>
<td>248</td>
</tr>
<tr>
<td>Epilogue-1</td>
<td>Carl Ritter in Berlin</td>
<td>259</td>
</tr>
</tbody>
</table>
Frontispiece

Middle Germany in Ritter's Early Years

[Map showing various cities and towns in Middle Germany, including Berlin, Hanover, Braunschweig, Magdeburg, Quedlinburg, Halle, and Leipzig, among others.]
On September 30, 1815, the philosophic and methodologic foundation for Carl Ritter’s geography was complete. It was the first attempt to provide a rigorous logical foundation for geography as an independent discipline. Ritter’s geography rested on the knowledge collected by geographers from the time of the Greeks, but what was new was a logical structure which paralleled the development of other contemporary sciences. In Germany, many other disciplines had just completed similar undertakings. Physical Anthropology took shape at the hands of J.F. Blumenbach in Göttingen. Geology and Mineralogy received a logical methodology under J.G. Werner and the students of his Freiburg Academy, Leopold von Buch and Alexander von Humboldt. Chemistry underwent logical transformation by F.A. Gren in Halle. The liberal arts including History, Philology and Aesthetics were also seeking new logical foundations since the mid-eighteenth century through the efforts of J.G. Herder, August Wolf, and descendents of the Baumgarten School. Philosophy itself was struggling to accommodate and work out the implications of Kant’s new critical philosophy. In this setting, Ritter’s attempt to create a scientific geography by applying a comprehensive system of logic is not unexpected. What is unexpected is the way in which he brought it about.

Ritter was an innovator who may not have shared the genius of other famous thinkers of the time, but had talent and saw a great need to collect and discipline the accumulated knowledge of explorers and scientists of the time into a form efficient for the general needs of science. Ritter’s place among the great philosophers and scientists of the time was as a student who continually struggled to master new material. This is true not only of his early years (1779-1817) as a student in Schneipfenthal and Halle, and as a private tutor and independent scholar in Frankfurt and Göttingen, but also of his mature years (1820-1859) as a professor in Berlin. Ritter was highly regarded in his time by many eminent scientists and philosophers. He did not go beyond existing philosophy, but rather applied what he considered to be the most fruitful system as an organizing element for geography. For Ritter this came from pedagogic theory and the theories of human psychology which formed its base.
The primary aim of this study is to generate a new understanding of Ritter's contribution to the foundation of Geography as a social science by evaluating systematically its connections to the general scientific and philosophic currents of the time. It is hoped that misjudgements and confusions which persist in recent evaluations of Ritter's work might be removed. This is attempted by a careful consideration of the early formation of Ritter's geographic thinking where the contributions of individual scientists and philosophers can be readily identified and evaluated. These sources are traced through Ritter's explicit acknowledgement of debts and influences, but also by examining sources of specialist terminology Ritter adopts in all his early writings, including the first volume of the *Erdkunde*. The most often debated theme in Ritter's work—the intent and meaning of the terms *general* and *comparative* in his general comparative method—are linked to their immediate origins in eighteenth-century philosophy and pedagogy. The general comparative method is examined as it was practised in contemporary science. The individual works of thinkers in these disciplines also reveals sources of scientific ideas employed by Ritter. The most important of these are the ideas of environmental determinism, spatial differentiation and natural delineation. Collectively, these ideas comprise a concept much akin to Ratzel's anthropogeography.

The sources of Ritter's thinking are traced chronologically. His education as a youth in Schnepfenthal (Chapter III) and as a student in Halle University (Chapter IV) is carefully examined as is the development of his pedagogic and scientific thinking as a tutor in the Bethmann-Hollweg household in Frankfurt during the Napoleonic Wars (Chapters V and VI). Especially important are his meetings in Autumn 1807 with J.H. Pestalozzi—the famous Swiss educator—and Alexander von Humboldt (Chapter VII). Ritter produced important works in 1802, 1804, 1806, and 1808. In 1810 he completed a manuscript (now lost) which was the transitional step in the establishment of a new scientific geography. These works reveal the developing pattern of his thinking in preparation for the writing of the first volume of the *Erdkunde* in Göttingen between the years 1813 and 1817, and each is examined in depth and in connection with the circumstances of Ritter's life in a period of great social and political unrest. The first volume of the *Erdkunde* is considered in Chapter VIII.
A physicotheological theme which recurs implicitly and explicitly in Ritter’s work and in the work of many scientists and pedagogues of the time, is the concept of hierarchy in nature, or what Arthur Lovejoy called in 1936, the chain of being. The theory is explained in Chapter II and its implications and connections to human psychology and pedagogy are examined in detail in order to explain Ritter’s continual commitment to an inductive approach to geography. This conceptual apparatus was a precursor of evolutionist thinking and is also fundamental to Ritter’s understanding of humanity as a species undergoing continual development toward the divine. Its connections to Ritter’s concept of regional hierarchies is not explored. This was the subject of Emil Hözels’s (1896) brilliant discussion of Ritter’s thinking.

Perhaps the most important aim of this study is to provide fresh material in English by literal translation of many key passages from Ritter’s early writings and an explanation of many terms which have caused difficulty in understanding Ritter’s approach to a new academic discipline. In addition to the terms Vergleich—comparison, and Allgemein—general, other terms such as Klarheit—clarity, Anschauung—cognition, and Erdkunde—earth science, are explained as part of the vocabulary that accompanied Ritter’s new concept of geography. Translations of two early works by Ritter are provided in the appendices.

In many ways this study of Ritter must necessarily remain wanting because of the abundance of ideas found in this period of German intellectual history. Ritter was born in 1779 and died in 1859 and his life embraces the development of an enormous variety of thought, beginning with physicotheological claims of the accessibility of divine revelation in nature, and concluding with the evolutionist theory of natural selection. Ritter’s early years in particular constitute a period of sufficient complexity to cause Clarence Glacken to terminate his historical work in the eighteenth century (Glacken, 1967, r.e. 1976, p.xii). In many ways, Ritter’s work is the culmination of eighteenth-century thinking. Margarita Bowen laments the lack of studies in the geographical literature concerning the period of romanticism and its effects on science (Bowen, 1981, p.12). German writers of importance to Ritter in his formative period include the philosophers Herder, Kant, Eberhard, Fichte, and Schelling. Among scientists must be counted Werner, Willdenow, Zimmermann and Blumenbach, as well as Ritter’s close acquaintances Sömmerring, Ebel and Hausmann. Among geographers and naturalists one must include the Forsters, Alexander von Humboldt, Leopold von
Buch, and in his own way Christian Sprengel. Perhaps more important for Ritter's personal development were the pedagogic theorists and practitioners of the period. In addition to the celebrated Pestalozzi, these include among Germans, Basedow, Salzmann, Zerrenner, and Ritter's lifelong friend and confidant GutsMuths. Ritter drew ideas from all these individuals as well as other luminaries including the classical philologists August Wolf and the Schlegels. In his own way, Ritter brought these diverse threads together into one all-embracing system of geographic science.

Concurrent with the development of Germany's intellectual realm, was the development of its political realm ranging from the extreme particularism of absolutist times, through the extreme German nationalism of the Napoleonic era (1806-1814), to the erratic discontinuous incorporation of liberalism in the Metternich Period. Each philosopher and scientist including Ritter reflected and contributed to these chapters in German history. Ritter was especially sympathetic to reformers who sought national renewal and the alleviation of the hardships of village life through mass-education. This was the Volksaufklärung—enlightenment of the people, which was promoted in Switzerland by Pestalozzi and by numerous pedagogues in Germany including Ritter's stepfather H.G. Zerrenner.

In the development of science, the late German enlightenment is of special interest because of its chronological and functional position between renaissance neoplatonic science and the modern era of positivistic science. The former highly idealistic approach, derived from the ancients and expressed in the seventeenth-century as a monistic mixture of Cartesian and Spinozist elements, was brought together by Leibniz and propagated throughout the German speaking lands in the eighteenth century by Christian Wolff. The latter materialist approach, derived from a dualistic mixture of Cartesian and Baconian elements, was brought together by Newton and Locke and propagated throughout most of continental Europe by the English and French empirical schools and given a decisive impulse by the empirical elements in Kant's critical philosophy. Ritter trained in both approaches and incorporated elements of both in his geographic science.

Dualism of mind and nature, spirit and material, subject and object, or however it is semantically represented, repeatedly appears from the time of the ancients as an ultimate problem of science and metaphysics. This dualistic problem found expression
not only in the collective philosophies of the eighteenth century, but also in Ritter's geography. He addresses it by adopting an objective idealistic framework, drawing upon elements from both rational and empirical eighteenth-century human psychology as developed especially by pedagogic theorists. In continental Europe as a whole, the empirico-mechanical conception of man, and associated sensualist theory, was disseminated by the French, La Mettrie, Helvetius, et al., but especially in pedagogic respects by Rousseau in his epoch-making *Émile ou de l'éducation*—Émile or Concerning Education, 1762. But in the German speaking lands the practical elements of Rousseau's thinking were often incorporated into a peculiarly German rationalist tradition whose orthodoxy is normally identified with the Leibniz-Wolffian School. It was an orthodoxy that was not ready to surrender to a strict mechanico-dualistic interpretation of the universe and continued to thrive in the nineteenth century.

Recognition of the Leibniz-Wolffian monistic orthodoxy in Germany is probably what stimulated Ladis Kristof to write in his review of the origins of German geopolitics in the nineteenth century that:

...many...German and other thinkers [were] not likely to separate the physical from the metaphysical realm. They [saw] in the empirical world either the material expression of the spiritual or merely a stepstone in the movement toward a higher stage—toward the spiritualization of all material (Kristof, 1960, p.21).

In Ritter's time, "...the material expression of the spiritual..." was the fundamental assumption of the physicotheological mission. Likewise, "...the movement toward a higher stage..." was a fundamental element in Ritter's own teleology—the perfection of humanity. It is true that the Frenchman Comte declared the era of metaphysical science closed in 1829 and therefore invalid for the purposes of science, but Kristof is quite correct in ascribing an anti-dualist view to many German thinkers of the nineteenth century, and his article subsequently sheds considerable light on organic theories of the state and the aims and limits of analogical reasoning in German geopolitics. He also reveals much about the dubious mixing of metaphysical and scientific metaphors that accompanied the propagandist elements of this school. But insofar as mind-nature dualism persists in a form impenetrable to positivistic rationality, often mere rhetorical appreciation of metaphysical reasoning has been substituted for rigorous examinations of meaning. The failure to understand thinkers like Ritter is attributed to a veil of ineffability which is purported to shroud Anglo-
American understanding of this and later periods of German conceptual thought. This view is characteristic especially of the secondary literature on Ritter. The problem is basically one of language and context. There is no particular reason why meanings within a metaphysical context must remain obscure if the context itself is understood clearly.

In 1829, twelve years after Ritter published the objective idealist construct and teleological programme of his Geography, the positivistic philosopher Auguste Comte explained that knowledge had already passed from a theological state, where the world was explained in terms of supernatural forces, through a metaphysical state where the world was explained in terms of abstract forces, and had come to rest in positivism where the world would be explained in the reducible terms of concrete regular connections between empirically observable phenomena— that is, knowledge which is verifiable by observation and measurement. In the post-Kantian era, what could not be known, should not be asked (Comte as cited in Gregory, 1978, p.26). Ritter who promoted empiricism in his own work would not have disagreed with Comte’s practical empirical methodology. It was the ultimate aim that differed. Positivism in the era of critical philosophy could only appear to Ritter and many of his contemporaries, who were trained in the spirit of physicotheology, as an efficient means to a greatly circumscribed, impoverished end.
Ritter’s life and work reflects an enormous range of philosophic and scientific ideas and influences (Figure 1-1). Especially crucial for the understanding of Ritter’s life work, is a knowledge of the early years in the development of his thinking. Many misconceptions that exist in Anglo-American appreciations of his work are the result of a failure to examine its intellectual origins. This is compounded by an uncritical dependence by Anglo-American geographers on German authorities who have only recently begun to examine critically the early formative period of Ritter’s geography. Careful consideration of the literature on Ritter reveals that the view that has persisted in Anglo-American thinking is the one published by Richard Hartshorne in 1939. This interpretation dismisses the importance of the early influence of Alexander von Humboldt and downplays the innovative quality of Ritter’s earliest geographic works. The influence of pedagogic theory is not fully appreciated and the failure to understand his diction is attributed to muddled thinking.

Ritter was not a muddled thinker, nor was his geography unsophisticated. The rigorous scientific nature of Ritter’s work was recognized in his own time and the first volume of his *Erdkunde* was accorded great academic acclaim. He was called to Berlin and awarded the Chair of Geography at a university which harboured legendary leaders of German philosophy including G. W. Hegel and F. Schleiermacher. Ritter had a definite method and plan for his work and his teleology adopted a logical structure that was common to most contemporary philosophers. His contribution was an innovative and original application of existing mainstream philosophy and science. His general comparative methodology had a rigorous logical meaning which can be traced in the writings of his contemporaries and forebears. A review of the current

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1"Ritter wanted to be taken seriously not as a high priest or as a delphic oracle, but as a researcher."
Figure 1.1
Ritter's Early Intellectual Influences

Carl Ritter
(1779 - 1859)

Philosophy
- J.J. Rousseau
- J.G. Herder
- I. Kant
- L.H. Jakob
- J.A. Eberhard
- A. Wolf
- J. Fichte
- F.C.W. Schelling

Pedagogy
- J.B. Basedow
- J.C. GutsMuths
- C.G. Salzmann
- W. Hufnagel
- H.G. Zerrenner
- J.C. Campe
- J.H. Pestalozzi

Science & Geography
- J.R. Forster
- E.A.W. Zimmermann
- A.G. Werner
- C.M. Sprengel
- J.F. Blumenbach
- S.T. Soemmerring
- J.G. Ebel
- J.K. Freiesleben
- J.L. Heim
- L. von Buch
- A. von Humboldt

*Indicates personal contact.
conventional wisdom about Ritter is both an interesting and effective means for introducing the most important elements in his thought.

The conventional wisdom and understanding of Ritter's life and work rests on a new intellectual plateau established with the publication of several editions of critical articles in 1979 commemorating the bicentennial of his birth (Richter, 1983; Lenz, 1981; Büttner, 1980). Inasmuch as new themes, interpretations and debates can continue to arise some 120 years after Ritter's death, is testimony to the rich and complex pattern of thought in his time. Ritter eludes precise classification as opposed to thinkers such as Marx, Hegel or Kant who unequivocally state their philosophic positions. The most meaningful statement that has been written is Plewe's assertion that:

...more clearly even than in Humboldt's case--his work mirrored his active participation in all the intellectual movements of his time (Plewe, 1968, p.517).

Active participation is misleading in one sense despite Plewe's elaboration that Ritter was at the centre of some controversies. Ritter was not a philosopher, by his own admission, and likewise, despite the nationalistic implications of some of his ideas, he remained as apolitical as possible in an era of great political change in Germany (Plewe, 1959, p.99). But Ritter's writings do incorporate ideas from many varied sources with little accompanying explanation. He also harboured an eclectic toleration for most systems of ideas, suggesting for example that extreme rationalism, which he sought to purge from Geography, had its appropriate place in other sciences, i.e. the rational sciences (Mathematics, Geometry, Astronomy, etc.) as opposed to the representational sciences of which Geography, History and Natural History were examples (Ritter, 1806, pp.199ff.).

The early works and ideas of Ritter are of particular interest, for it is in this period that Ritter acquired and assembled all the basic components of his methodology. In the early evening of October 31, 1815, in Göttingen, the programme of geography which Ritter sought to employ in his Erdkunde was clearly enunciated for the first time. Ritter read to his friend and colleague Hausmann what was later to be published as his introduction to the Erdkunde. The eminent geologist greeted it with wonder and great enthusiasm. There is little evidence that Ritter ever sought to revise this
programme, despite his growing apprehension that his work would never be completed. Hanno Beck describes Ritter’s treatment of Arabia in volume 13, published over thirty years later in 1847 as "...ein Muster von Ritters vergleichender Methode"—a model of Ritter’s comparative method (Beck, 1979, p.93). Ritter’s later methodological papers are translated, if imperfectly, into English, and elaborate in various ways ideas from his earlier writings. Friedrich Ratzel whose Anthropogeographie, 1882-1891, owes much to Ritter’s thinking, describes these later treatises as "...Nebenwerk und Nebenprodukt seiner Erdkunde,"—incidental works and byproducts of his Erdkunde (Ratzel, ADB 28:693). This is particularly true of the historical component which grew in importance to Ritter.

The restricted focus on the early works is prompted also by a lack of studies dealing specifically with the origins of Ritter’s thought. According to Plewe, the early works of Ritter have been overlooked as if of only antiquarian interest and have not been systematically criticised as he argues has been done with A. von Humboldt’s early work. The Erdkunde has often been the starting point. As Plewe further observes, it is in these early works, where:

...legt...man meist den Finger auf die wenigen Punkte, mit denen sich die moderne Forschung rückblickend, also dort aus unistorischer Sicht, nicht mehr einverstanden wähnt und verallgemeinert sie (Plewe, 1981, p.38).²

It is in these early works where the intellectual influences on Ritter can be identified and traced systematically. This is achieved by careful comparison of these shorter works with the biographical circumstances which surround their preparation. In this way, Ritter’s correspondence, diaries and notebooks can be employed to bring greater coherence and context to the understanding of his intellectual development. Likewise, the chronological development of Ritter’s use of philosophical and scientific terminology can be closely followed. It is significant that Ritter uses the term Erdkunde for the first time in 1806, eleven years before the publication of his work bearing the same name (Ritter, 1806a, p.204).

²"...one lays most often his finger on the few points, which modern research retrospectively considers, from an unistoric viewpoint, no longer believing to be in agreement with and generalizes [this viewpoint to include all these early works]."
Conventional Wisdom of the Anglo-American School

A careful review of the Anglo-American literature on Ritter’s life and work reveals a heavy dependence on the authority of German secondary sources. More revealingly, these German sources have been transmitted primarily by the efforts of Richard Hartshorne in *The Nature of Geography*, 1939. Hartshorne’s evaluation of Ritter is based on what he describes as the exhaustive studies of previous [German] students. He identifies what he considers to be the important critical studies (Peschel, 1877; Martha, 1879; Ratzel, 1879; Hozel, 1896; and Wisotzki, 1897). He further asserts that in each study their findings are referred back to the original work (Hartshorne, 1939, p.59). This approach is not without its problems: for example, Hartshorne criticizes as exaggerated Peschel’s view that Ritter’s meeting with Alexander von Humboldt in 1807 was the critical experience that turned him to geography. Despite repeated assertion of this view by other German writers, Hartshorne, citing the authority of Ratzel, argues that this did not accord with the facts of Kramer’s authoritative biography which draws insights from Ritter’s own diaries. Hartshorne further explains that Ritter had been trained to think as a geographer from a very early period and did not decide to continue his geographic work until some ten years after the von Humboldt meeting (Ibid., pp.50-51). Hartshorne also suggests that the geographic historians Dickinson and Howarth were misled in various important respects because of their use of the [less-authoritative] biography by the American writer Gage (Ibid., p.50).

I shall argue in Chapter VII that despite Hartshorne’s assertion, the Peschel view is fundamentally correct. Ritter’s 1807 meeting with von Humboldt was the critical experience resulting in Ritter’s conceptualization of the possibility of Geography as a legitimate science in accordance with other sciences of the time. Von Humboldt’s scientifically derived views confirmed in Ritter’s mind the plausibility of applying the conceptual apparatus of the Pestalozzi Method to Geography—an idea with which Ritter was preoccupied at the time and which became his life’s work. This can be demonstrated clearly in an article published shortly after their meeting where Ritter cites and explains the importance of von Humboldt’s influence (Ritter, 1808c, p.207). In the introduction to the *Erdkunde*, he describes this conceptualization as the "Grundidee"—basic idea of his study (Ritter, 1817, pp.22-23). Peschel writes that it was Ritter’s conversation with von Humboldt which "...plötzlich Klarheit über seine Lebensaufgabe brachte"—suddenly brought clarity concerning his life’s task. According to Peschel, who cites a speech given by Ritter in 1844 honouring von Humboldt, Ritter
himself tells us that he "...die Anregung zu seiner [Ritter's] wissenschaftlichen Richtung einem Gespräch mit Humboldt verdankt..."—owes the stimulus of his [Ritter's] scientific direction to a conversation with Humboldt (Peschel, 1877, p.312). It is true, as Hartshorne states, that Ritter had been trained from an early period to think geographically. But the decision, taken ten years after his meeting with von Humboldt, was not—whether to be a historian or a geographer, but rather to become a nationalist educator with the widest possible range of effectiveness.

Ritter was formally trained as a pedagogue and remained committed to education and the development of German culture throughout his life. His commitment to geography, like history, was subordinate to these fundamental interests. Ritter formally became a geographer because he was offered a highly desirable position as a geographic educator. The University of Berlin was founded in 1808 by J.G. Fichte and Wilhelm von Humboldt, as part of the movement to institute a national system of education. Ritter's commitment to teaching was so strong, that while preparing the first volume of the *Erdkunde* in 1816, he wrote that eventually he would be content to find a job teaching in a village school (Kramer, 1875, p.246). Hartshorne's view is not incorrect in a parochial sense, but its effect has been to direct geographers away from the most crucial period in the development of Ritter's geographic thinking. Squabbles over mistranslations of isolated phrases from Ritter's entire opus are scarcely relevant to this crucial early period in Ritter's thinking.

The apparent difficulties of interpretation which surround this important episode aptly illustrate the general problems of interpreting specific theoretical problems in Ritter's work. This is true especially of the meaning and intent of his use of the terms *comparative* (vergleichend) and *general* (allgemein) as in his so-called *general comparative geography*. This has been a central theme in the critical literature since the time of Ritter. Plewe's dissertation, an important source for Hartshorne's chapter on Ritter, cites several different interpretations among Ritter's immediate students and contemporaries (Plewe, 1932, p.65). These include:

1. regional geography (Länderkunde)—Wunsch, Pütz;
2. anthropogeography—Reuter;
3. historical geography (mostly topography)—Volger;
4. zone teaching—Fröbel;
Plewe also observes that Ritter's system was understood as non-traditional [i.e. eighteenth-century] geography or as a type of nomothetic geography. These categories are not mutually exclusive.

Plewe sought to diminish the importance of this problem by suggesting that in the absence of unequivocal logic and precise language, a final verdict was neither possible nor necessary for an appreciation of Ritter's work (Ibid., p.28, 55).

Hartshorne perpetuated this view in 1939 by translating Plewe's assertion that "...strict logic was not his [Ritter's] forte..." and concluded that:

...we are not to look for any specific meaning in these terms (comparative and general), but merely to understand that he [Ritter] had certain general purposes in mind that he wished to contrast with those of his predecessors (Hartshorne, 1939, pp.58-9).

Plewe's own lifelong commitment to the study of Ritter's work is testament to his hope that these terms could be explained precisely. In 1959, on the centenary of Ritter's death, Plewe was convinced that he had isolated the meanings by bringing to light several of Ritter's diaries which lay in the Klopstock Museum in Quedlinburg, [East] Germany. But Plewe's earlier view is important, because it is the view which has conspicuously persisted among Anglo-American geographers--presumably through its dissemination in Hartshorne's still widely consulted work. The persistence of this early view is underscored by Dickinson's acknowledgement in 1969 of a general uncritical dependence on German authority which is characteristic of most English language accounts. Dickinson cites "...a senior and highly respected German geographer..." Heinrich Schmitthenner as one such authority (Dickinson, 1969, p.38).

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3Wilhelmi (1821) conceived this as the unrealized end-product of Ritter's work.
This dependence on German writers is linked in the first instance to the problem of language, the reason urged most strongly in Preston James' widely read introductory historical text *All Possible Worlds*, 1972. The second edition appeared in 1981.

Scholars have struggled to find suitable translations for some of his passages which make sense in another language yet which do 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 never critical of his own ideas, nor quite clear about what he wanted to say (James, 1972, re. 1977, p.170; James and Martin, 2nd ed., 1981, p.130).

According to James, Ritter's *Erdkunde* is chiefly of antiquarian interest (Ibid., p.172). Such a view unfortunately dismisses and discourages further investigation into an entire chapter of geographic thought that is relevant not only to the emergence of academic geography, but also to the history of ideas in general. Margarita Bowen cites James' work and marginalizes Ritter's contribution to geography by limiting it to teleology and grouping it with the work of Büssing (Bowen, 1981, p.172).

The German geographer Schmitthenner whom Dickinson cites offered a better balanced assessment of the problem of interpreting Ritter. He endorses Ratzel's observation that in Ritter's letters, shorter publications and generally in the descriptive and reference sections of the *Erdkunde* his language is clear and simple. But in other sections particularly those where he endeavours to summarize, the diction becomes obscure and difficult and often leads to misunderstanding and distorted judgements (Schmitthenner, 1951, p.35). Schmitthenner who recognizes the importance of semantic change in this period makes a further comment that the sense of many words and expressions of that time are different from present meanings--a problem which the German historian Reinhard Koselleck described recently as the *Sattelzeit*--saddle-time, or the period of transition between the modern era in which words have the same meaning as today, and an older era when the language itself must be the subject of explanation (Koselleck, 1985, xii). Schmitthenner's student Hanno Beck subsequently points out that a new geography, just like a new philosophy, implies a semantic revolution. A great difference exists, for example, between the language of mid-eighteenth-century geographer Büssing and the language of Ritter (Beck, 1979, p.68). Despite Beck's hint of an exegetic approach to Ritter, he still promotes the orthodox view when he writes that:
Die Sprache Ritters ist dunkel, dabei allerdings nicht ohne gelegentlichen Glanz. In ihrer Dunkelheit konnte sie gewiß mehr umfassen und ausdrücken und war insofern Teil seiner Methode... Die dunkle Sprache gibt dem Werk die Würde, die ihm notwendig erschien, da es eine Annäherung an Göttliches ist. Mit scharfen und doch viel zu groben Definitionen hätte er sich der Lächerlich preisgegeben (Beck, 1979, p.68).4

In 1981, Plewe sought to bring this discussion full circle, when in response to this remark he made the practical observation that:


It was Plewe's previous shift away from the Erdkunde to Ritter's earlier works as the primary source for interpretation that ushered many of the new insights that accompanied the bicentennial of Ritter's birth in 1979. This took on a visible form through the Plewe-Beck exchange which accompanied these commemorative volumes.

General Comparative Geography and the Plewe-Beck Debate
The considerable German secondary literature on Ritter has become increasingly thematic. Aside from review works of a biographical nature, recent studies include: Ritter's contribution to cartography (Klemp, 1983; Kretschmer, 1981; Engelmann, 1966; Lehmann, 1959); Ritter's relationship to other philosophers and literary figures of the time (Ahrbeck, 1983; Kirschke, 1983; Schulz, 1983; G. Engelmann, 1981; Büttner, 1981, 1980; Hoheisel, 1980); the Goethe question (Schmitthenner, 1937); physicotheological interpretations of Ritter's work (esp. Büttner, 1981, 1980; see earlier work by Richter, 1904); and Ritter's impact on the academic geography of various countries: USSR, (Utkin, 1983, Grau, 1983); UK, (Freeman, 1983); Poland, (Babicz, 1983, 1981); Hungary, (Somogyi, 1983); USA, (Kish, 1981, Hartshorne and Gurgel, 1980); France, (Claval, 1980). In addition to these works, recent interpretations by Beck and Plewe should be recognized as the direct progeny of the excellent early

4 "Ritter's language is obscure, and is thereby certainly not without occasional splendour. In its obscurity, it was able to conceive and express more and insofar as it did, it was part of his method...The obscure language gives the work its value. It appeared necessary to him as an approach to the divine. With heavy-handed and certainly much too imprecise definitions, he surrendered himself to absurdity."

5 "Ritter wanted to be taken seriously as a scientist and not as a high priest or as a delphic oracle."
studies which Hartshorne cites in 1939 (Beck, 1986, 1981a, 1979; Plewe, 1981, 1959). Specifically, these recent interpretations address the central question of meaning in Ritter's use of the terms *general* and *comparative*. All these studies pursue questions of fundamental importance to historians of science as well as to modern methodological thinkers who see similarities between present problems and those of the past. In relation to Ritter they all contribute to an understanding of the most fundamental question which has been asked: what did Ritter intend to be understood by the title of his main work:

\[\textit{Die Erdkunde im Verhältnis zur Natur und zur Geschichte des Menschen, oder allgemeine, vergleichende Geographie, als sichere Grundlage des Studiums und Unterrichts in physicalischen und historischen Wissenschaften} \text{ (see Figure 1.2).}\]

The question might be reduced to: (1) what is *Erdkunde* and how is it distinguished from Geography; (2) what relationship does *Erdkunde* have to the other sciences and their methods of instruction; and (3) what is *general, comparative geography*?

The most plausible interpretation is that the title is a simple parallel disjunctive conjunction of two phrases. *Erdkunde* corresponds with *General Comparative Geography*. Likewise, *in Relationship* corresponds with *as a Secure Foundation for Research and Instruction*. And finally, *to Nature and the History of Man* corresponds to *in the Physical and Historical Sciences*. Several trivial but revealing conclusions can be derived from this parallelism. First, Ritter understood nature and history as subjects for scientific inquiry, and saw the study of nature, as synonymous with physical science. Likewise he saw the study of man as the subject of history. Secondly, *Erdkunde* was fundamental to both the physical and historical sciences as well as to the method of their instruction. This further suggests that science and pedagogy shared a common methodology. The third conclusion and perhaps the most immediately revealing is that *General Comparative Geography* was simply another name for *Erdkunde*. In this way *Erdkunde* was distinguished from traditional *Geography* by virtue of its incorporation of a general, comparative methodology. If these observations are true, then the most fundamental question to be asked about Ritter’s *Erdkunde* is: what are the meanings of the terms *general* and *comparative*.

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6"Earth Science in Relationship to Nature and to the History of Man, or General Comparative Geography, as Secure Foundation for Research and Instruction in the Physical and Historical Sciences"
Die Erdkunde
im Verhältnis zur Natur und zur Geschichte des Menschen, 
or allgemeine, 
vergleichende Geographie, 
als 

die Grundlage des Studiums und Unterrichtes in 
physikalischen und historischen Wissenschaften.

Carl Ritter

Erster Theil

Berlin, 1817.

B. G. Reimer
Ritter’s attempts at definition provide the primary material upon which Plewe and Beck based their interpretations.

The Substance of the Debate

The Plewe-Beck debate over the meaning of the terms general and comparative has a dual character. It is concerned not only with the specific meanings of the terms, but also with identifying their respective origins. These two questions are of course closely related, for the meanings remain problematic if the terms remain isolated from the body of theory from which they originate—a problem which the geographer Joseph May once described as "coherence" (May, 1972, pp. 79-81). This is especially true of the term comparative.

Until 1959, Ritter’s words, as published in the introduction to the Erdkunde, 1817, were accepted uncritically as indicating the origin and meaning of the terms. Ritter writes of the term comparative:

Vergleichend, wird sie [Geographie] zu nennen versucht, in demselben Sinne, in welchem andre vor ihr zu so belehrenden Disciplinen ausgearbeitet worden sind, wie vor allen z.B. die vergleichende Anatomie (Ritter, 1817, p.21).7

Ritter does not define the term here, he only indicates its origin to an audience who understood its meaning within the context of the sciences of the time. Elsewhere, in a much cited letter written to the famous comparative anatomist S.T. Sömerring in the summer of 1815, when Ritter was actually working on the introduction, Ritter wrote that the main character of his work consists in the fact:

...daß sie [Geographie] eine vergleichende (im Sinne der Anatome comparata) [Wissenschaft ist] und das Wechselverhältniß der anorganischen und organischen Natur wie zur Völkergeschichte darzustellen bemüht ist (Ritter to Sömerring, Summer 1815, in Kramer, 1875, p.235).8

7 "Comparative is proposed as a name for this [geography], in the same sense in which other [branches] have been developed to such instructive disciplines, as for example, above all, comparative anatomy."

8 "...that it [is] a comparative [science] (in the sense of Anatome comparata) and has endeavoured to portray ethnic history and the interrelationship of inorganic and organic nature."
He specifically refers to the teachings of the comparative anatomist Blumenbach as instrumental in his structuring of the *Erdkunde*. But he also acknowledges Hausmann who was a geologist and mineralogist. If Ritter’s words do little to define precisely the term *comparative*, there is ample evidence that his knowledge was not exclusively derived from comparative anatomy. The evidence of his diaries indicates that he was concerned more with inorganic science at the time of his preparation of the methodological introduction (Ibid., p.235).

Despite his attempt to explain the term *general* in the introduction to the *Erdkunde*, the origin of the term is not as well documented by Ritter.

In the absence of an historical context, his definition is not without difficulty. Traditional eighteenth-century geography was often criticized for its traditional focus on current problems or its subservience to the aims of statesmanship and commerce. It is generally known that Ritter sought to go beyond such parochialism. This is evident especially in his desire to establish a natural system of delineating the earth’s surface in opposition to the traditional emphasis on state boundaries. But there is at least one other possible meaning. Ritter may also have used the term to denote what is elsewhere described as *universal concepts* which are derived from what Kant called "*komparative-Allgemeinheit*"—comparative generality, a term used to denote the comparative refinement of concepts usually associated with the inductive process (Kant,

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9"This earth description is called general, not because it labours to give everything, but because it endeavours to investigate with no regard to a special purpose and with equal attention, each part of the Earth in accordance with each of its forms whether they be fluid [atmosphere and hydrosphere] or fixed [lithosphere], in distant areas of the world or in the fatherland, or whether it be the show-place of a cultural group or a desert. For only from the basic-types of all essential developments of nature can a natural system arise."
1787, re., 1966, p.52). Ritter’s pursuit of essential or ideal forms proceeded through just such a process of iterative refinement. Ritter cites Francis Bacon on the title page of the *Erdkunde*: "Citius emergit veritas ex errore quam ex confusione"—Truth emerges more quickly from error than from confusion.

The Plewe-Thesis 1959

One plausible solution to the question of definition lies in examining how the terms *general* and *comparative* are logically linked. This apparently is what Plewe had in mind in 1959 when, after deciphering several unknown Ritter diary entries concerning Ritter’s visit in 1807 to the Pestalozzi Institute in Yverdon, he saw the words linked in just such a way. In a series of remarkable diary entries, Ritter records his thoughts concerning the Pestalozzi pedagogical method which was understood by Ritter and others (including Fichte) as a generalized method of constructing a science regardless of subject matter. In this context, Ritter writes:


Plewe found the apparent sequential hierarchical linkage of the terms in this passage so compelling that he concluded:

...daß er [Ritter] historisch durch Iferten auf den Vergleich gebracht worden ist, daran ist nicht zu zweifeln...Auch hier führen erst wieder seine Tagebücher zu einer verblüffend einfachen Lösung...(Plewe, 1959, p.122).

10"The pure operation of the method for the construction of science is very remarkable. The learning of individual objects [is] the first step. The comparison of the available from all standpoints, the second step. This is the staircase which leads to the third, to the generally ordered according to all possible conditions. Or the result of the whole or the requisite system constructed by nature itself according to all perspectives, which are provided not by man, but by nature itself. [This is] the single possible system of all science, for all aims of science and life."

11"...that it is not to be doubted historically that through Yverdon, he [Ritter] had been brought to comparison...here again, the diaries lead us to an amazingly simple
Plewe argues that Ritter's *Erdkunde* is distinguished from topographic elementary geography by the incorporation of the latter two steps of the Pestalozzi's three-step method of instruction, i.e. the comparative and general steps. Plewe does not explore the origin or the logical mechanics of this three-step system and therefore fails to provide a conclusive argument. Beck rightly raises this as a legitimate complaint (Beck, 1979, p. 115). In fairness to Plewe, such an undertaking lay outside the scope of his paper, which sought primarily to bring to light new Ritter materials. But this was a legitimate starting point for Beck's criticisms of the Plewe-Thesis.

**Beck's Critique and Definition 1979**

The subsidiary issues in the debate are interesting. Beck begins by agreeing that Ritter's 1807 meeting with Pestalozzi in Yverdon was important to Ritter's conceptualization of the *Erdkunde*, but it was not the origin of Ritter's adoption of a general, comparative methodology. Beck argues that it is obvious from visual inspection of the full title that *General Comparative Geography* is not sequentially consistent with the latter two steps of the three-stepped pedagogic system which are inverted, i.e. comparative, general. He also notes that nowhere in the nineteen volumes of the *Erdkunde* did Ritter invert the sequence as found in the title. Beck agrees that the three-stepped system in Ritter's diary is sequentially linked, but Ritter's inversion of the terms indicates that he could not have derived it from the Pestalozzi Method (Beck, 1979, p. 114).

The strength of Beck's counter argument does not rest on this deduction alone. He surmises that the three-stepped system was an original creation of Ritter's mind which already may have been trained to think in terms of the comparative method, i.e. Ritter's own systematic comparative version of what he understood as the Pestalozzi Method (Ibid., pp. 114-115, 127). Ritter never stated that he took this system directly from the words of Pestalozzi and Beck further reveals that according to the knowledge of several Pestalozzi experts, no such three-stepped system ever formally existed, despite the system's affinity with other Pestalozzi three-stepped systems (Ibid., pp. 115, 127). Finally, and perhaps conclusively, Beck argues that the persuasive power of the Plewe-Thesis is ultimately undermined by Ritter's statement in the introduction

solution...
to the *Erdkunde* that *comparative* came from *comparative anatomy*. He cites Ritter's statements in the later Fröbel Controversy asserting the same (Beck, 1961, p.116). The comment that Plewe must have overlooked Ritter's statement in the *Erdkunde* is only rhetoric.

The influence of Pestalozzian ideas are not dismissed by Beck. Like Plewe, he was well aware of another of Ritter's diary entries which suggests a prominent role for such ideas in the body of the *Erdkunde*. In 1815/16 while working in Göttingen, Ritter writes:

*Meine ganze geographische Arbeit ist Darstellung der Pestalozzischen Methode--sie ist vom Standpunkt des Erziehers aus geschrieben, und darum umfaßt sie die ganze historische Seite des Unterrichts* (Ritter, 1815/16, in Plewe, 1959, p.165; emphasis added in accordance with original diary entry, V343-RT IV/21, p.11).

But according to Beck, Ritter's work was representative of the Pestalozzi Method only insofar as it adopted the central category of cognition (Anschauung). Indeed Ritter's diary emphasizes *Anschauung*.

*Darum hebt sie die Seite der Anschauung und ihren Einfluß auf den inneren Menschen, auf ihre Notwendigkeit für jeden Menschen zur selbständigen Darstellung seiner Individualität in dem wirklichen Leben, wodurch jedesmal eine der platonischen Ideen realisiert werden muß, was ja immer die Aufgabe jedes Menschen ist, und durch die er nur zum Besitz des freien Gebrauchs seiner eigenen Kraft teils zum Aufnehmen des Fremden, teils zum Produzieren des Eigenen gelangen kann* (Ibid., p.165; emphasis added in accordance with original diary entry, ibid., p.11).

Ritter's reference to the realization of platonic ideas within the context of cognition is an unmistakable acknowledgement of the Leibniz-Wolffian theory of human knowledge which assumes the existence of innate (angebome) ideas. Neither Beck nor Plewe has

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12 "My entire geographic work is representative of the Pestalozzi Method--it is written from the standpoint of an educator and embraces therefore the entire historical side of instruction."

13 "Therefore it [the *Erdkunde*] elevates the aspect of cognition and its influence on the inner man, on its necessity for each man so he can represent his own individuality in real life, whereby in each case, a platonic idea must be realized. This of course is always the task of man, and only through it he can acquire possession of the free use of his own ability, partly for the incorporation of unknown, partly to the production of that which is uniquely his own."
explored systematically or in any significant depth the mechanics of this theory, Ritter’s exposure to these ideas, or the various ways in which they are expressed in Ritter’s work. Likewise, neither author has explored the relationship of the role of comparison as a basic faculty of mind in pedagogic theory and the comparative sciences of Ritter’s time.

Beck attempts to define the comparative method by careful consideration of the *Erdkunde*. He concludes that what Ritter understood by the comparative procedure is nothing other than:

\[\ldots\text{die Zusammenstellung historischer, chronologisch geordener Quellen, vor allem von Reiseberichten (Beck, 1979, p.115).}\]  

After some searching, he relates this to a passage in the *Erdkunde*, vol. 7, p.452, where Ritter calls such an arrangement, with some reservation, "comparative." Beck further argues that Ritter ultimately sought to create a series of historical transects of an area which were comparable over time. As a result it:

\[\ldots\text{ergibt sich für den Leser selbstverständlich eine Stufenfolge, die Ritter "vergleichende Zusammenstellung" genannt hat...In dieser lag stets auch eine echte historische Entwicklung beschlossen (Beck, 1979, p.116).}\]

Beck does not explain the procedure of comparative anatomy except to say that Ritter’s procedure resembles it. He asserts elsewhere that all sciences of the time had been greatly influenced by the model of comparative anatomy and observes that Goethe in collaboration with the von Humboldt brothers and J.C. Loder, had produced an introduction for comparative anatomy (Beck, 1986, p.3). Beck does not pursue the question, nor does he recognize the importance of Herder’s comparative anatomical thinking. Instead his article enumerates many different attempts at a comparative approach in Geography over the centuries, in particular in connection with theories of environmental determinism.

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14"...the arrangement of historic, chronologically ordered sources, primarily travel reports."

15"...produces for the reader an obvious stepped-sequence which Ritter called "comparative arrangement"...This always includes also a genuine historical development."
Beck’s purpose here is confusing. According to his own argument Ritter’s comparative method must be qualitatively different from these earlier geographic applications of the comparative method by virtue of its incorporation of the model of comparative anatomy—a product of the mid-eighteenth century. Beck appears to recognize the chain of being in Ritter’s thinking, but fails to explain the pervasiveness of its role here or in comparative anatomy, despite the central role it plays in Goethe’s and Herder’s anatomical thinking. It led to the celebrated and disputed discovery by Goethe of the intermaxillary bone in humans in 1784 (Wells, 1978, p.16). Goethe recognized this anatomical feature as an archetypical form, and understood the task of the biologist as the creation of a clear idea of such archetypical forms [i.e. Urtypen and Urformen] by a process of repeated comparison of a large number of specimens (Ibid., p.17). This was clearly the direction, but not necessarily the source of Ritter’s thinking.

Plewe’s Response 1981

Plewe does not address himself specifically to Beck’s objections to his main thesis, and Beck is justified in his claim that his counter-argument has never been refuted properly (Beck, 1989). Plewe does make a few relevant points in criticizing Beck’s interpretation, arguing that Ritter did not necessarily take the comparative method from comparative anatomy, because that discipline is only one among many that were mentioned. Plewe adds comparative linguistics, comparative religion, comparative law, comparative arts (Plewe, 1981, p.46). It is noteworthy that he does not mention geology as a comparative science despite its use of a comparative methodology in this period.

Plewe also criticizes Beck’s interpretation of general. Plewe argues that Beck reads too much into Ritter’s phrase "...jeden Teil der Erde,"—each part of the Earth, from which Beck infers that the object of Ritter’s Geography is:

...das volle Kontinuum der Erdoberfläche...in welchem es also keine leeren Stellen geben darf (Plewe, 1981, p.46).  

16 "...the full continuum of the Earth’s surface...in which there must be no empty places."
Plewe says that his own interpretation places more emphasis on the phrase "...jede ihrer Formen ihrem Wesen nach"—each of its forms according to its essence (Ibid., p.46). These forms include surface features, climate and water features, the plant and animal worlds, man and his way of life, etc. Together these forms constitute a natural system which is a legitimate subject of study in itself and is not investigated solely to serve the needs of other sciences (Ibid., p.46). Beck’s words might be understood alternatively as indicating that different natural regions (i.e. desert regions, river valley regions, etc.) were to be "generally" investigated without emphasis on any particular type.

"Allgemein" bezog Ritter auf die ganze Erdoberfläche, von der er Wüste wie Stromtal berücksichtigen wollte (Beck, 1979, p.76).  

Plewe does not elaborate the possibility of Ritter’s use of general to denote universal-concepts, i.e. a level of abstract inductive generalization, despite the repeated citations of Ritter’s use of archetypes and essential forms and the theory of cognition. In particular, Plewe did not respond to Beck’s criticisms by further elaborating how the terms general and comparative might be linked within Pestalozzi’s thought. Neither Plewe nor Beck explore Ritter’s use of the chain of being as an important device for his conception of human understanding as well as the organization of nature itself despite the clear hierarchical elements of his thought as Emil Hözel has described (Hözel, 1896).

17"General for Ritter refers to the entire Earth’s surface, of which he wanted to consider deserts just as well as river valleys."
Many elements of physicotheology are found in Ritter's thinking perhaps betraying his
great optimism for science, but these elements are not unsophisticated or employed
unscientifically. Ritter's thinking depends heavily on the principle of continuity as it
was expressed in eighteenth-century concepts of what Arthur Lovejoy calls the chain of
being (Lovejoy, 1936). Examination of Ritter's later methodological articles reveals
explicit citations of this conceptual device and was the point of departure for this study
(Ritter, 1826, p.178; 1833, p.252; 1850, p.349; see Ritter, 1852 as translated by Gage,
1861; see also published lecture Ritter, 1862 translated by Gage, 1865, p. xii). In the
context of the chain of being, Ritter's comparative principle may be understood as the
procedure of identifying and positioning phenomena in accordance with their rightful
locations in the natural chain which extends from inanimate rocks, to living beings, to
human thought and the divine. The comparative principle was also associated with the
procedure of generalisation—the third step in the progression from observation to
comparison (the ordering process) to the disclosure of general forms and archetypes.
Ritter did not adopt any of the fanciful and simplistic versions of the chain that were
current at the beginning of the nineteenth-century. Instead, like many other scientists,
he adopted the Leibnizian version that emphasized continuity throughout a monistically
conceived nature. This principle is fundamental to Ritter's understanding of human
psychology and pedagogy both of which were legitimate scientific disciplines and were
fundamental in Ritter's attempt to give Geography a logical structure.

Theoretical elements of the chain have been recognized in the secondary
literature on Ritter. Emil Hözel observes the continuous hierarchical taxonomy of the
chain in Ritter's work and infers a linkage with a hierarchical ordering of regions

"For dear friends, in God's nature there is no leap. Everything is a ladder full of
steps on which things advance from the lowly to the noble."
Oscar Peschel mentions the chain in comparative anatomy, but argues that Ritter could not apply the methods of this discipline to create a comparative geography, because the problems were qualitatively different (Peschel, 1870, p. 1). Recent studies of Ritter have recognized the importance of idealistic typology or Ritter's use of *Urtypen* and *Urformen*—original or archetypical types and forms, but their linkage to eighteenth-century taxonomy has not been discussed (Plewe, 1932, pp.33-34; Tatham, 1951, p.46; Dickinson, 1969; Beck, 1981, p.18; et al., see also general discussion of *Urphenomenon* by Seamon in Ley and Samuels, ed., 1978).

[East] German biologist Siegfried Kirschke has put his finger on one of the important experiences in Ritter's early life. In 1800, Ritter travelled to Göttingen where he met the world famous natural historian and comparative anatomist J.F. Blumenbach. Blumenbach discussed with Ritter natural taxonomy and the "Stufenleiter in der Natur"—stepladder in nature (Ritter, 1800, in Kramer, 1875, p.75). But this taxonomic concept derived from the chain of being was promoted by Blumenbach as a research tool which must be employed critically. Indeed, the critical evaluation of materials was Ritter's lifelong work.

**The Chain of Being: Continuity in Natural Science and Philosophy**

The Great Chain of Being is an ancient concept derived from the platonic metaphysics of the *Timaeus* where the world is postulated to be an holistic hierarchical divine emanation—or for medievalists and renaissance philosophers, an "...ontological structure corresponding to the dynamism of emanation...each link is a level of being, whose dignity depends upon its distance from God" (L.W. Beck, 1969, p.48). For thinkers of the German Enlightenment, this quasi-mystical dynamism was expressed by theories of *Kräfte* (forces or powers) as developed by Leibniz and promoted especially by Herder. As a taxonomic device for natural science, the chain is more specifically based in the platonic idea of an infinite universe of infinite variety—the so-called *plenum forum* concept or what Lovejoy calls the *principle of plenitude* (Lovejoy, 1936, r.e., 1982, p.52). All that can be conceived to exist must of necessity exist, no potentiality may remain unfulfilled in a perfectly created universe. The principle of continuity in nature which is fundamental to the chain is derived directly from this principle or as Lovejoy further observes:

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2 The eighteenth and nineteenth century rendering is "das Prinzip der Mannigfaltigkeit"—terminology employed by holistic thinkers including Ritter.
If there is between two natural species a theoretically possible intermediate type, that type must be realized ... otherwise, there would be gaps in the universe, the creation would not be as full as it might be, and this would imply the inadmissible consequence that its Source or Author was not good in the sense that adjective has in the *Timaeus* (Lovejoy, 1936, r.e., 1982, p.52).

Aristotle, a student of Plato’s Academy, first advocated the use of a single, continuous graded scale as an expedient natural device for classifying the phenomena of nature, assigning to each species a corresponding degree of perfection or spiritual energy. The application of this principle and the principle of plenitude led to the contemplation of nature as a unified whole, where all matter, or the structural forms of its occurrence, came to be regarded as a continuous hierarchical chain which stretched by imperceptible degrees, from the simple inorganic mineral elements, through the more complex organic but aspiritual plant and animal kingdoms, through the organic and spiritual human kingdom, to the purely spiritual kingdom of angels and archangels of which God was the pinnacle. Indeed this stepped sequence (Stufenfolge) in nature was recognized in Ritter’s own work by Emil Hözel who notes that for Ritter there were:

...nur Unterschiede und Grade der Lebensbethätigung, "der Kristall, die Pflanze, das Tier, der Planet, der Mensch sind in aufsteigender Linie verschiedene Organismen des irdischen Daseins der Dinge" (Hözel, 1896, p.384 quoting Ritter).3

The chain was a well-nigh fundamental assumption in eighteenth-century German physicotheology derived especially from the knowledge of Bruno, Spinoza, and the Cambridge Platonists, but it gained great practical legitimacy from successful application in the sciences, particularly botany and zoology (Saine, 1971, p.54). German physicotheologians often based their knowledge on the rigorous conceptual version of Leibniz. This version legitimized the chain for rationalist scientists because it was derived not theologically, but rather philosophically (Saine, 1971, p.54). It was based on the principle of continuity which could be demonstrated mathematically. The most frequently cited eighteenth-century literary expression of this underlying continuity and unity in nature, which also found a place in Ritter’s stepfather’s writings, was

3...only differences and degrees of vital energy. 'The crystal, the plant, the animal, the planet, and mankind are in an ascending series, and are different organisms of the terrestrial existence of objects.'
simply: "...in Gottes Natur ist kein Sprung"--in God's nature there is no leap (Zerrenner, 1792, p.427).

The Leibnizian Chain

In the eighteenth century, several versions of the chain existed, each with its own subtle ontology and implications. In his studies of Herder, perhaps the most important mid-eighteenth-century German proponent of the chain, H.B. Nisbet reduces these versions to four basic conceptions:

...a static series of natural entities, arranged in the gradually ascending order of their relative complexity...;

...a dynamic series of natural entities; this corresponds either to the theory of successive creation, in time, of living species, from simple to complex...or, in its later equivalent to the modern theory of the evolution of species by descent...;

...a static series of ideal entities, a hierarchy comprising not only the known earthly forms of life, but also transcendental beings...; [and]

...a dynamic series of ideal entities; this corresponds to Leibniz's and Herder's theories of developing 'Kräfte,' to the doctrines of metempsychosis and palingenesis, and to other related conceptions (Nisbet, 1970, p.218).

This last version, emphasizing the principle of continuity and dynamism, was widely employed by eighteenth-century scientists and philosophers (Ibid., p.232). Among natural scientists it received wide dissemination in one of the fullest accounts of nature of the time in Charles Bonnet's Contemplation de la nature, 1764. These ideas were studied and propagated by both Herder and Goethe (Nisbet, 1972, p.8). The work was translated into German by J.K. Lavater in Zürich during the period of his close association with Pestalozzi. Among philosophers and pedagogic theorists the concept as applied to psychology was disseminated as a part of Christian Wolff's theory of knowledge in his Vernünftige Gedanken von den Kräften des menschlichen Verstandes--Rational Thoughts on the Powers of Human Understanding, 4 1712, which went through many editions and is recognized as the direct progeny of Leibnizian

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4This was an introductory text for students who had not yet mastered Latin or French. See also his Vernünftige Gedanken von Gott, der Welt und der Seele des Menschen, auch alle Dinge überhaupt, 1720, which also went through many editions and for which he is remembered more often.
theory itself. Herder also popularized and applied such thinking in his psychological essay *Vom Erkennen und Empfinden*—On Knowledge and Sensation, 1775, where the mind was explained as a series of developing faculties (Kräfte). The generality of Leibniz’s philosophic reworking of the chain made it suitable for application in both the natural and human sciences. In eighteenth-century German theories of knowledge, this continuous stepped-sequence (Stufenfolge) in nature paralleled the belief in a continuous stepped-sequence in the structure of human thought. This latter structure is described by the pedagogic historian Arthur Stein as *Helligkeitstheorie*—brightness theory (Stein, 1945, p.138).

**Helligkeitstheorie—the Process of Knowledge**

The primary argument of *Helligkeitstheorie* is that consciousness (BewuBtsein) or knowledge (Erkenntnis) is ultimately a question of degree, and that all knowledge is grounded in consciousness. By application of the principle of continuity, it was asserted that there is a continuous scale of consciousness which ranges from obscure (dunkel), to clear (klar) and distinct (deutlich) knowledge or what Leibniz described as the way from *notio obscura* through the *cognitio clara* to *distincta notio* (Leibniz, 1684 as cited in Stein, 1945, p.177). This idea is closely related to Leibniz’s conception of *petit perception*, that is, that our ideas and concepts are comprised of an infinity of simpler sensations, and that we come to clearly and distinctly know or understand these ideas and concepts by systematically raising our consciousness of the individual sensations of which they are comprised. Clearly this can be conceived as a graduated process with a graduated series of hierarchical levels. It also matters little whether these ideas are innate (angebome, e.g. platonic ideas) or derived solely from experience (sinnliche). The process of their realization by the mind is the same. The process is described also in similar ways by philosophers as diverse as Fichte and Kant who disagreed on many other problems.

This theory gave rise to an extensive logical vocabulary which described not only the various levels of knowledge, but also the associated processes. The vocabulary has its ostensible origin in the writings of Descartes and Spinoza. Descartes writes for example:

"Clarum voco illam, quae menti attendenti praesens & aperta est; sicut ea clarè à nobis videri dicimus, quae oculo intuenti praesentia, satis fortirer & apertè illum movent Distinctam antem illam, quae, cum Clara sit, ab omnibus, aliis ita
Leibniz assembled this thinking into a coherent system, and appended Spinoza's concept of *adequate* knowledge, in his less-cited, but crucially important early work "De Cognitio, Veritate, & Ideis," which was published in the Leipzig *Acta Eruditorum* in 1684 (Figure 2.1). In more systematic form, Leibniz explains:

Est ergo cognito vel obscura vel *clara*; & clara rurfus vel confusa vel *distincta*; & distincta vel inadaequata vel *adaequata*, item vel symbolica vel *intuitiva*; & quidem si simul adaequata & intuitiva sit, perfectissima est (Leibniz, 1684, p.537).

Similar logical chains of definition are found in the works of Christian Wolff and other early and mid-eighteenth century German philosophers. A fundamental task of much eighteenth-century philosophy was rigorous description and definition of this lexicon as well as the unambiguous linkage of process with these states of knowledge. This latter task received special treatment by J.B. Basedow who is responsible for its direct introduction into pedagogic literature.

**Johann Bernhard Basedow (1723 - 1790)**

The first German thinker to attempt to put the Leibniz-Wolffian system to the service of pedagogy in a definitive way was the theologian and philosopher Johann Basedow. As a writer and as founder of the Dessau Pedagogium, where Ritter's teacher Salzmann received pedagogic training, Basedow became the most influential and authoritative voice of philanthropic reform in German education in the eighteenth century. Basedow's most influential philosophic work was published in 1764 as
Figure 2.1
Leibnizian Structure of Knowledge

Adapted from: von Engelhardt, 1955, p.49
Philalethie—Friend of Truth,7 which primarily sought to defend Christianity against its enemies by doing away with unbiblical appendages. But the work also contains in systematic geometric expository style his own theory of knowledge (Erkenntnistheorie). The work was followed almost immediately by his Theoretisches System der gesunden Vernunft,—Theoretical System of Sound Reason, 1765, a condensed version of his Philalethie which follows the same numerical arrangement. The two works constitute an excellent source for an understanding of the theory behind Basedow’s pedagogy and is a source that is extensively drawn upon by a succeeding generation of pedagogues including Ritter’s stepfather Zerrenner—an influential pedagogic writer in his own right (Zerrenner, 1794-5, pt.2, pp. 61-3). Basedow covers a wide range of topics in these works but what emerges from a careful consideration of the theoretical questions he addresses is a comprehensive system of knowledge. This is perhaps the chief importance of Basedow for pedagogic theory. He provides a very straightforward and simplified discussion of the process of knowledge. In so doing, he not only draws upon the thinking of the Leibniz-Wolffian School, but also on Rousseau and the French School including Helvetius and La Mettrie who were influenced by English empiricism and the sensationalism of Locke.

Basedow’s Erkenntnistheorie

Basedow’s Erkenntnistheorie adopts the same Leibnizian language that Wolff and many other theorists continued to promote in their own systems, although Basedow goes much further than Wolff in explicitly linking the terminology to particular steps within the process of knowledge. This is especially true of the terms comparative and general—the latter being derived from the former through the process of ordering. In connection with Helligkeitstheorie the degree of ordering corresponds to relative degrees of clearness and distinctness of ideas.

Basedow begins by observing that there are ideas (Vorstellungen) of different types that exist in the human soul (Seele) and the capacity for such ideas is called mind (Verstand)(Basedow, 1765, §39). Like Wolff before him, Basedow denies that it is necessary to question in detail the nature of these ideas (whether they are innate or sensual), or to distinguish between mental images (Vorstellung) and ideas (Ideen)(Ibid., §40). He also appears to place an emphasis on sensually derived knowledge betraying

7Philalethes is a pseudonym for King Johann von Sachsen.
Basedow describes mind (Verstand) as consisting of three parts: (1) the capacity of five senses (i.e. cognition of external objects); (2) the capacity of retention or memory (Gedächtniß); and (3) the capacity to construct new ideas, which Basedow suggests operates for the most part according to unknown rules (Basedow, 1765, §39, §41, §45). The first two capacities provide the mind with simple ideas, especially through the process of attentiveness (Aufmerksamkeit). But such knowledge is described by Basedow as partial, one-sided (einseitig), or absolute (absolut), and is derived from immediate observation of an object's colour, form or absolute quantity (Basedow, 1764, §42). It is the last capacity, the construction of new ideas, which is the object of Basedow's special interest and he explores it in depth.

Once attentiveness has furnished the mind with simple ideas, the construction of new complex ideas can begin. This construction proceeds in the first instance from the process of comparison or what Basedow describes as the simultaneous contemplation of two or more objects:

Wenn die Seele eine Idee oder ihren Gegenstand einigemal nach einander mit andern Ideen und Gegenständen zugleich denkt, oder immer zu der einen Idee wieder zurück kehrt; so thut sie dasjenige, was man Vergleichen nennt. Eine anhaltende Vergleichung ist der Zustand der Reflexion (Basedow, 1765, §46).  

The result of this process is no longer merely partial or one-sided absolute knowledge of the characteristics of an object, but rather a knowledge of relative characteristics or what Basedow describes as a knowledge of associations (Verhältnisse), connections (Beziehungen) or relations (Relationen). These relations include: similarity and dissimilarity, equality and inequality, precedence and succession, proximity, and so on (Basedow, 1764, §34). Such relations, or aspects (Gesichtspunkte), allow us to recognize commonalities between things and to ascribe these commonalities to other

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8"Whenever the mind thinks a few successive times of an idea or its object in simultaneity with other ideas and objects, or continually returns to the one idea, so the mind does what is called comparing. A continuous comparison is the condition of reflection."
things not yet considered (Basedow, 1765, §47). Each of these common characteristics in turn can be abstracted or considered as an essential concept (Inbegriff) in its own right and may be considered as a category, species or class. For Basedow, "[e]ine Gattung ist also der Inbegriff aller Dinge, die eine gewisse Aehnlichkeit haben"—a species is therefore the essential concept of all things which have a certain similarity (Basedow, 1765, §49). This can only be derived from comparison.

But Basedow also notes that species (Gattungen) can be conceptualized in two different ways which he defines as: (1) a general way of thinking (durchgängige Denkart) where each member of a species shares a common characteristic; or (2) a unifying way of thinking (vereinigende Denkart) where each member of a species is considered as part of a single whole. It is the former conception which is described by Basedow as a general or universal concept.

To summarize Basedow's system it might be said that knowledge is developed first from the exercise of attentiveness to provide the raw material for thought, secondly from comparison which orders ideas into classes, and thirdly from abstraction of common characteristics into general concepts.

Basedow also offers definitions for each of the terms of the Leibniz-Wolffian Helligkeitstheorie. These definitions are stated more simply than in Wolff's system and are linked more directly with the process which brings about degrees of clearness. As an unmistakable echo of Leibniz, Basedow writes:

Unsere Erkenntnisse sind entweder dunkel oder klar; und die letzten sind entweder undeutlich oder deutlich...Ein jeder / geringerer Grad der Klarheit hat den Namen der Dunkelheit, in Vergleichung mit dem höheren Grade derselben. ...Deutlichkeit hat sehr viele Grade, und einen gerinigen Grad derselben nennt man Undeutlichkeit, in Vergleichung mit einem höheren (Basedow, 1764, §59).10

9 "The thought which comprehensively comprises an entire species is called by the learned a general concept, or a universal concept."

10 "Our knowledge is either obscure or clear, and the latter is either indistinct or distinct...Any small degree of clarity is called obscurity in comparison to a higher degree
Basedow describes an obscure (dunkel) idea as one which is not noticed (bemerken) by the inner sense (innerlichen Sinn). There is no memory of its origin, it has no referent (Basedow, 1765, §59). Obscurity can be lifted in the first instance by attentiveness—which is described as the directing (Richtung) of the internal sense on this or that idea—or by increased awareness or consciousness (Bewußtsein)—which is described as noting (bemerken) by the inner sense (Ibid., §42). Clear ideas in turn are ideas which are distinguished from others and have been assigned to a species (Gattung).

Wer von dem Gegenstände einer Vorstellung verschiedenes denkt, z.B. daß er nicht zu dieser oder jener, sondern zu einer andern Gattung gehöre, der denkt den Gegenstand mit einiger Klarheit (Ibid., §59).\[1\]

Clarity therefore implies comparison or is derived from comparison, for clarity is derived from the process of ordering ideas. A distinct idea according to Basedow is a more highly refined clear knowledge and arises when the parts and internal characteristics of an idea are clearly known individually (Ibid., §59).

Basedow also speaks of complete (vollständig) distinctness which closely parallels the Leibnizian idea of adequate knowledge. Complete distinctness implies the capacity to provide a definition which neither too broadly nor too narrowly indicates the characteristics of an object (Ibid., §60). Basedow notes that the more clearly and distinctly a subject is known, the more vivid (anschauend) and less symbolic (symbolisch) the knowledge is (Basedow, 1764, §61). Knowledge is either real or verbal. Real-Knowledge (Real-Erkenntniß) is described as vivid (anschauend) because the knowledge is cognized sensually (Basedow, 1765, §64). Verbal-Knowledge (Verbal-Erkenntniß) is merely the knowledge of words or symbolic knowledge. It is characterized by a deficiency or incompleteness of cognition (Ibid., §64). An idea is lively (lebhaftig) when the object of thought is as apparent to the mind as if the object were immediately occurring before the senses (Ibid., §45). In this way Basedow

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of the same...Distinctness has many degrees and a smaller degree of the same is called indistinctness in comparison to a higher degree."

\[1\]"Whoever thinks about the object of an idea in different ways, for example, that it does not belong to this or that species, but rather to another, then that object is thought with some clarity."
provides terms to denote an apparent degree of real knowledge. In a more practical way, Basedow argues that development of vivid ideas is the most effective means of educating youth and observes that unfortunately it is the latter mere knowledge of words which characterizes the current methods of instruction (Ibid., §44). It is this view which laid the theoretical groundwork for the so-called natural method of instruction as conceptualized by Rousseau or what was otherwise understood as the Versinnlichungsmethode—the sensual method, which was applied and developed with great success by Salzmann, Wolke, Pestalozzi and many other German pedagogues (Zerrenner, 1794-95, pp.50-51). Carl Ritter was among the first to be educated comprehensively in this way.

Basedow's Concept of Continuity in Nature

Basedow’s use of the principle of continuity in the process of knowledge accords with his belief in the continuity of nature. In his Philalethie, Basedow includes a discussion of natural science and the process of investigation and discovery. The details of his thinking are interesting, but it is his affirmation of the concept of continuity in nature that is most relevant here. Basedow attributes the difficulties of scientific taxonomy to the continual discovery of new intermediate classes (Zwischenclassen) which continually cast doubt upon existing class borders. He observes that there are many animals that are similar to humans, or transitional species between the mineral and plant kingdoms. The existing deficiency of taxonomic classes is derived according to Basedow from insufficient differentiation (Basedow, 1764, v.I, §117). This is the reason why the designation of species has such a shaky (schwankend) meaning and why the imitation and misuse of mathematical methods is so damaging (Ibid., §117). This is a reference to the Linnean system. As an alternative, Basedow suggests that the application of the principle of continuity is efficacious.

Ich habe noch anzumerken, daß man den beschriebenen analogischen Satz von der genauen Angrenzung der Geschlechter oder Arten der Dingen, das Gesetz von der Stetigkeit zu nennen pflege (Ibid., §117).12

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12"I must still note that the described, analogical theorem of precise contiguousness of families or classes of things, is usually called the law of continuity."
Basedow’s knowledge of the chain of being is not dogmatic, but as an adherent of the Leibniz-Wolffian School he took quite seriously the law of continuity.

Ritter was directly and indirectly influenced by Basedow’s ideas. As a child, Ritter was educated in accordance with Basedow’s principles as developed by Christian Salzmann in Schnepfenthal. As a college student in Halle he studied pedagogy formally, acquired the associated terminology, and became progressively interested in theory. Basedow was essential reading for all aspiring pedagogues. As a teacher in Frankfurt, Ritter continued his reading in theory and was inspired by his stepfather Heinrich Zerrenner who had known Basedow personally and who continued to promote his ideas. After a meeting with the pedagogue J.H. Pestalozzi and the scientist Alexander von Humboldt in 1807, Ritter saw the possibility of applying the logic of pedagogic theory to geography in order to create a new geographic science. This was the task he devoted himself to as an independent researcher in Göttingen. In Göttingen, Ritter produced the first two volumes of the *Erdkunde* which as Ritter described was written from the standpoint of an educator.

In contrast to the explicit definitions Ritter provides to explain his general comparative method, the definition implicit in his stated desire to create *Klarheit*—clarity, by ordering terrestrial phenomena, is perhaps the most revealing definition of all (Ritter, 1817, p.8). It is so important to Ritter’s system that he describes this principle of ordering as a "Grundregel"—fundamental rule, that forms the foundation for the *Erdkunde* (Ibid., p.25). This implicit definition links Ritter’s thinking to the logical structure of eighteenth-century *Helligkeitstheorie* and associated theories of knowledge. It is in this semantic context that his language has precise logical meanings, especially his use of the terms *general* and *comparative*. He uses these and other related terms throughout all his later work.

Despite Ritter’s commitment to clarity, he has been misunderstood partly because the philosophic and pedagogic language he used to formulate his geographical ideas was not recognized by later generations of geographers. This might be attributed partly to increasing specialization in the sciences. In his own time, he was recognized as a faithful disciple of eighteenth-century philosophy and pedagogy, and his innovative approach to geography was appreciated. It is the aim of this study to show how Ritter acquired this conceptual vocabulary, how he gained his extensive knowledge of
science, and how he applied the conceptual logical apparatus of pedagogy to geography. It is hoped that a review of Ritter's sources of ideas will clarify the mechanics of his geographic thinking and illuminate his personal motivation for writing the *Erdkunde*. This requires careful consideration of the circumstances of his life and those whom he considered his friends and mentors.
PIETISM AND CARL RITTER'S EARLY YEARS

"Das Buch der Natur ist das Buch, das Gott selber geschrieben hat..."

C.G. Salzmann, 1784

The thought of Carl Ritter like that of many of his contemporaries is difficult to classify precisely. He is often identified as a pietist and the pietistic elements in his thought are often described as teleological insofar as Ritter understood the earth as the home of man. This teleology is but one aspect of the pietistic themes in his thought. Pietism had many subtle dimensions as a philosophic force in the eighteenth century. These dimensions include a commitment to cultural pluralism or relativism which is expressive of the pietist commitment to the concept of individuality—perhaps derived from the early rejection of a priestly class and an emphasis on individual relationship with God. This pluralism was fundamental in Herder's thinking and to the development of his influential theories of Humanität and Urpoesie—folk poetry which finds expression in Ritter's work in his conception of the individuality of folk groups (Völker) and their associated countries (Länder) as Hözel aptly shows (Hözel, 1896).

Pietism also rejected all dogma, even the orthodoxy of the Lutheran Church. Many theologians subjected fundamental beliefs to rationalist analysis and critique. The Bible itself was increasingly understood relativistically as a product of its time and a specific human group. It was also interpreted as a product modified by later embellishment and no longer an unequivocal source of God's revelation. Indeed a primary impetus to physicotheology was the pure revelation in unembellished nature. Such scientific study brought with it many rationalist strands, but the aesthetic contemplation of nature, which was also fundamental to romantic philosophy, was derived from introverted emotional forms of religious experience. The emotional part of pietist experience helps to explain the intensity of the German nationalist movement in the period of Napoleonic hegemony (1806-1813).

Pietism also had a practical social reform agenda that fuelled the movement for mass-education. It was a human duty to perfect whatever individual abilities were

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1"The book of nature is the book that God wrote himself..."
bestowed by God. Likewise it was the duty of every nation to perfect itself as a collective expression of God’s will. This was to be achieved by the provision of education to all social classes. In the absence of a unified German state and the reluctance of many principalities to commit themselves to such an undertaking, the task was to be achieved in the first instance through Christian charity. Christian philanthropy and eighteenth-century German educational reform are inseparable. Indeed, the provision of a free place for Ritter in the Salzmann school in Schnepfenthal was a direct result of the philanthropic system and attitude. The practical components of a philanthropic education like other branches of pietist thinking was anti-dogmatic and adopted much rationalist thinking. An enlightened system of education by its very conception necessitated a significant measure of enlightenment philosophy. Its theory was derived largely from Basedow, who combined the ideas of Rousseau with the language of Wolff. It possessed both empirical and rationalist elements traceable to Locke and Leibniz.

Ritter was a pietist, but he practised a moderate form. There were extreme factions, as for example the Separatist Movement which promulgated a hermit-like existence, or those reactionary circles who refused to relinquish the ossified orthodoxy of traditional Lutheran Scholasticism; and there was a broad range of intermediate outlooks and opinions each of which were either fertile or infertile ground for the reception of rationalistic and cosmopolitan strains of the enlightenment. In the eighteenth century a general enlightened version of pietism emerged which promoted Christianity in increasingly sophisticated ways. Therefore if Ritter can be classified at all in his early years, he is probably best described as an "enlightened pietist," or what Schleiermacher called "...a Pietist of a higher order" (Pinson, 1934, pp. 72, 144-5). Ritter’s formative years in Quedlinburg, Schnepfenthal and the University of Halle reveal his systematic exposure to enlightened ideas within the pietist tradition. These years are crucial to the understanding of his philosophical and scientific disposition.

Quedlinburg (1779-1785): Lineage and Kinship

Carl Ritter was born in Quedlinburg in 1779 to a family which had lived for several generations within the city and its environs. In the eighteenth century, Quedlinburg was a city well within the orthodox Protestant realm and was a protectorate of Brandenburg until 1803 when control was transferred to Prussia. It was located also within the spiritual periphery of Halle--an important pietist centre--and Calvinist
enclaves also took root in the area particularly within the Anhalt Principality. In fact, the extreme Separatist Movement founded its spiritual home in Quedlinburg itself. This eclectic mix of orthodoxies and the associated religious tolerance that permitted diverse religious practices in this area was characteristic of other parts of Protestant Germany and may be attributed to the neutral religious stance adopted by the Constitutional Association of Princes. The religious character of Quedlinburg was described in a geographical handbook of 1810 as predominantly Lutheran with a mixture of reformed faiths (GutsMuths, 1810, alphabetically listed; 2nd ed., 1818).

There is nothing to suggest that the Ritter family was pietist in the Calvinistic sense. Ritter’s great-grandfather was a pastor who had studied theology at Jena and Wittenberg universities which followed Lutheran orthodoxy. His grandfather was a local retailer, and his father, Friedrich Wilhelm Ritter (1746-1784), was a doctor educated at Halle. A scientific education at Halle in the mid-eighteenth century included many rationalist and cosmopolitan elements despite the strength of Pietist proponents in Halle at that time (Pinson, 1934, pp. 127-8). Ritter’s father was a respected figure in Quedlinburg. His general medical practice was regarded highly and he was appointed as personal physician to Princess Amelia, the sister of Friedrich Wilhelm II. He was also required to serve as an expert witness in a medical malpractice case and subsequently became a target for slanderous attacks (1781) by Dr. Lehnhardt who was acquitted and allowed to continue his practice. The stress induced by these personal attacks are purported to have contributed to his early death (Kramer, 1875, p. 4). The surviving papers of Ritter’s father reveal that he carefully followed the medical literature of the time, wrote his own articles, and discovered a digestive powder which was effective and widely distributed after his untimely death from a "hitzen Nervenfieber"—high fever, in 1784 at the age of 38. He left behind a widow and six children (Obituary in Journal von und fur Deutschland, 1784, pp. 610-11; Kramer, 1875, p. 2). Ritter was only five years old.

Perhaps more influential to Ritter was the well-known piety of his mother, Elizabeth Dorothea Ritter (1753-1800). GutsMuths, a close family friend, made the observation, that by virtue of the enlightened circles in which she lived, she practised an "aufgeklärte Frömmigkeit"—an enlightened piety (Kramer, 1875, p. 8). Reason did not remove the necessity of faith, but faith coexisted with reason. At the time of her death from rheumatic fever on New Years Day 1800, she was known and greatly

55
respected for miles around by educated and common people alike who knew of her work to improve the education and well-being of children. The pedagogues K.G. Horstig and Hoogen both publicly acknowledged her contribution to the work of her second husband H.G. Zerrenner whom she accompanied on his school inspection trips in the region around Derenburg (Horstig, 1805, p. 106; Hoogen, 1800). The environment of Ritter’s earliest years and his family’s religious orientation can be described like other educated German families of this time in Brandenburg-Prussia, Saxony and Thuringia, as an enlightened piety which neither accepted uncritically the dogma of orthodox Lutheranism, nor the restrictive practices of Calvinism.

Upon the early death of Ritter’s father, the Ritter family faced great financial uncertainty. The continued education of Carl Ritter and his older brothers Johannes (1774-1864) and Wilhelm Ritter was of pressing concern as was the future of Johann GutsMuths who had worked for some years as a tutor in the Ritter house and who had become a close and trusted family friend (Kramer, 1875, pp. 14-5). The oldest brother Wilhelm Ritter, with the help of the Prince of Bemburg, received a place in a preparatory school affiliated to the Bemburgische Gymnasium. He later studied at Halle and became a preacher in Wilmersdorf. Carl and Johann Ritter continued to receive private instruction from GutsMuths who continued to teach without pay for some time, until the opportunity to study and work at the Salzmann Institute in Schnepfenthal presented itself as an alternative for both him and the Ritter brothers.2

Schnepfenthal (1785-1796): Pietistic Patriarchs and Enlightened Education

In 1784, Christian Gotthilf Salzmann had established a new experimental primary school in Schnepfenthal. Like most pedagogues of the time, who operated under the direct influence of pietistic circles, and as an earlier teacher at Basedow’s Dessau Philanthropinum, philanthropy was an important element in his educational ideology. Salzmann was also a few pupils short of a complete role of twelve and had actively sought as in later years to find promising candidates for his educational experiments

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2 Less is known about the earliest years of Ritter’s sister Charlotte who, like Johannes, remained in constant correspondence with Carl Ritter throughout his life. Charlotte Ritter later married E.F.W. Kramer who became a successful public official in Duderstadt. His brother Gustav Kramer prepared Ritter’s biography (1865) from family papers in his possession. Little is known about Ritter’s other siblings, although one younger brother is known to have died from smallpox at an early age. Less is known too about Ritter’s relationship with Zerrenner’s children.
(Salzmann to Campe, 1786, in Leyser, 1877). Consequently, he decided to accept one child under the age of six gratis. He read about the early death of Dr Ritter and the unfortunate circumstances of his widow and the "wohlgezogenen Kinder"--well-behaved children of the Ritter family in the Journal von und für Deutschland. With the help of a friend, he discovered Carl Ritter to be a good candidate. Salzmann offered Ritter a place and the offer was unreservedly accepted by his mother after she met Salzmann personally and had a chance to inspect his school (Kramer, 1875, pp. 16-7). Before her departure from Schnepfenthal, Salzmann also offered to include Ritter's older brother Johann in his instruction and to hire GutsMuths as a teacher in the Institute. The names of Carl and Johannes Ritter are listed as the third and fourth entries on the chronological register of Schnepfenthaler students and GutsMuths is listed as the fourth teacher (Müller, 1934, pp. 206, 320).

Schnepfenthal is located in a small valley at the northern edge of the Thüringer Wald, about thirty minutes by foot from Walterhausen, WSW of Gotha--a city which had a tradition of educational reform. In eighteenth-century pietist circles, Gotha was remembered as the seat of power of Duke Ernst the Pious who ruled from 1640-1675. Duke Ernst was an important early proponent of pietist educational reform and innovation, and in some measure, he was representative of the general thinking of the German Protestant princes of that time, but as the historian Hajo Holborn has written, he stands alone in his accomplishments (Holborn, 1964, p. 50). In collaboration with Andreas Reyher, Duke Ernst formulated and decreed the Schulordnung of 1648 in accordance with the educational model of Comenius, and as a practical realization of Luther's demand for the education of all social classes (Ibid., p. 51; Pinson, 1934, p. 33). The Schulordnung provided for the compulsory instruction of all children over the age of five years, in German, arithmetic and religious instruction. He established twenty new schools in the area which adopted relatively liberal methods of education (Pinson, 1934, p. 133). Duke Ernst's ideas concerning the role of education within the framework of absolutism and a division of classes ordained by God, were given currency through the writings of his privy councillor Veit Ludwig von Seckendorf (1626-1692) including: Fürstenstaat--Princely State, 1655 and Christenstaat--Christian State, 1685. These writings were widely recognized for a full century as "...the classic texts of political ethics and practical statesmanship in Protestant Germany" (Holborn, 1964, p. 51). It was from within the periphery of the court of Ernst the Pious, that August Herman Franke rose to prominence and later cofounded Halle University and
established Halle as the single most important centre of pietistic work. It was the
great-grandson of Ernst the Pious, Duke Ernst II of Sachsen-Gotha and Altenburg, who
provided financial support for Salzmann and the experimental school in Schnepfenthal.
Pietistic influences were clearly responsible for the existence of Salzmann’s school and
in some measure the opportunity for Ritter to attend.

Christian Gotthilf Salzmann (1744-1811): Physicotheology and Pedagogy
The foundation of Salzmann’s school in Schnepfenthal was the outcome of much
thought and experience. Salzmann had trained as a theologian in Jena (1761-64) and
worked for several years as a pastor. He was Pfarrer to Rohrborn in Erfurt in 1768,
Diaconus in 1772 and then moved to the Andreaskirche in Erfurt in 1781. His early
interests in pedagogy were stimulated by Rousseau and Basedow’s pedagogic ideas,
and he published several small pedagogical works and gained recognition through his
widely read Krebsbüchlein oder Anleitung zu einer unvernünftigen Kindererziehung—A
Small Book for Crabs, or Instruction for an Illogical Education of Children, 1780,
which called attention to the shortcomings of existing education. In 1781, he received
a call from Basedow to teach in the Philanthropinum in Dessau which was recognized
as the centre of enlightened education in Germany at this time. In Dessau, Salzmann
worked with Rousseau’s principles of education as set forth in Émile, 1762, but also
deepened his knowledge of the newly emerging educational psychology as given
concise form by the writings of Basedow. Like Basedow, Salzmann shared a desire to
confront critically the prevailing mechanistic and orthodox methods of instruction
which emphasized rote memorization and discipline, and replace them with a natural
system. The primacy of nature as the means of instruction was fundamental to
Salzmann’s system of education. This was derived not only from Rousseau’s naturalist
philosophy, but perhaps more fundamentally from Salzmann’s commitment to
physicotheology.

Physicotheological Elements
Salzmann’s theology placed great emphasis on the divine in nature as is evidenced by
both his pedagogical and non-pedagogical writings. Wilhelm Schwab considers that in
Salzmann’s conceptual system of revelation, nature’s revelation is not subordinated to
the traditional revelation of the Bible, but is of equal importance (Schwab, 1941, p.
78). In his Der Himmel auf Erden—The Heaven on Earth, 1797, Salzmann describes
three possible conceptions of God’s relationship to nature: (1) that God pre-determines
the world and its unfolding; (2) that God continues to work within the world through a
series of rational beings (verständiger Wesen) which are strongly subordinated to one
another; or (3) that God is united (verbunden) with invisible forces (unsichtbaren
Kräften) upon which the visible world depends, just as we are united with our own
body (Salzmann, 1797, p. 165). Salzmann notes that we cannot know for sure which
of these possibilities is correct. We must choose for ourselves. But he adds that the
third possibility is perhaps the most intelligible (begreiflichsten) (Ibid., p. 165). Nature
is not just the material expression of God's will but the actual essence of God's mind.
Nature's laws are the thoughts of God. There is no evidence that these ideas found a
place in Salzmann's practical instruction, but such a belief motivated his untiring
commitment to the teaching of natural science. A personal knowledge of nature for
Salzmann, was tantamount to a personal knowledge of God; and a personal knowledge
of God was a central, if optimistic, aim of pietistic education.

Pedagogic Theory
Knowledge of nature as a central aim of Salzmann's educational plan is expressed in
practical terms in his pedagogical writings. Of particular interest is Salzmann's Noch
das über Erziehung—Something More on Education, 1784. Here he sets out the
fundamental ideas upon which his school in Schnepfenthal was founded—especially the
natural method of instruction. Despite some differences with Basedow, Salzmann was
the first to admit that his ideas were influenced by his experiences in Basedow's
institute in Dessau (Salzmann, 1784, re., 1984, p. 33). Following Rousseau's
teachings, Salzmann believed that nature provided all the necessary means for
education, and like Basedow, he emphasized that the child's inclination to observe
nature was innate (angeboren). Therefore, development of a child's attentiveness and
abilities to compare and to differentiate (Unterscheidungsvermögen) phenomena are the
chief tasks of education. To promote these abilities Salzmann placed great emphasis
on collecting natural specimens during student field trips and took great pride in what
he called his Naturalienkabinett—nature cabinet, which he used on a daily basis as a
source of instruction and discussion among his students.

...wir vergleichen die gesammelten Sachen untereinander, bemerken, worin sie
einander ähnlich oder unähnlich sind, und schärfen so unser
Unterscheidungsvermögen, legen zehn bis zwanzig Produkte der Natur vor uns,
The discussion was held first in German and then repeated in French and Latin. Following a recommendation by Rousseau, drawing instruction was also promoted as an efficient means for students to develop their powers of attentiveness and observation. The central role of nature in Salzmann’s method is illustrated by his remark that the location of the buildings of his institute are so configured that the students can easily observe the rising and setting of the sun, moon, and stars, as well as the change of seasons. "Mein Naturalienkabinett ist Natur selbst,"—my nature cabinet is nature itself (Ibid., p. 36).

This procedure of instruction was rooted in human psychology and was often described in the eighteenth century as negative education—a term derived from Rousseau’s *Émile*. Like Basedow, Salzmann notes later in his *Ameisenbüchlein oder Anweisung zu einer vernünftigen Erziehung der Erzieher*—A Small Book for Ants, or Instructions for a Logical Education of the Educator, 1806, that a knowledge of phenomena is only meaningful by virtue of the ability to differentiate and categorise in accordance with classes, species and orders (Salzmann, 1806, re., 1888, pp. 98-9). Therefore knowledge of taxonomy was an indispensible aid for teachers. He cites as useful the reference works of several natural historians including Dietrich, Hoffman, Röhling, and Lesken, but perhaps most important for Ritter was the work of the natural historian Johann Matthaeus Bechstein (1757-1822) who taught in Schnepfenthal from the time of Ritter’s arrival in 1785 until the time of his departure in 1795. Bechstein was responsible for the ordering of Salzmann’s nature collections (Pfauch, 1989).

Despite Salzmann’s commitment to physicotheological thought and his adoption of psychological theory through the teachings of Basedow, Salzmann did not promote the chain of being or the principle of continuity as an ordering device for natural science. Neither did Bechstein. In an early period of his studies, Bechstein worked with Buffon’s version of the chain, but R. Gerlach asserts that Bechstein was among

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3"...we compare the collected objects with one another, we note how they are similar or dissimilar and thereby sharpen our faculty of differentiation, we lay ten to twenty natural items before us, investigate what they all have in common and thereby learn to abstract..."
the first in Germany to adopt the Linnean system (Gerlach, 1969). The Linnean system was the principal system offered to students in Schnepfenthal in Ritter’s period and it also formed the basis for Latin instruction by Salzmann and his Latin teacher C.L. Lenz who taught the modern Latin of Linnaeus rather than classical Latin (Lenz, 1788, pp. 143-44; Rommel, 1984, pp. 24-5). Salzmann also thought that the Linnean system provided excellent means for exercising the memory (Gedächtnisüübungen). Students were required to learn around 2000 names within a six-month period (Salzmann, 1808, p. 68). According to the school’s student newspaper, Ritter was reported to have been among Lenz’s best students in 1790, perhaps indicative of his early command of Linnean terminology (Schnepfenthaler Zeitung, 1790, p. 5). It is clear that Ritter’s early natural science education was firmly within the Linnean tradition. Such a knowledge was considered essential because of its wide use throughout Europe. But despite Ritter’s later extensive command of the terminology, his use of the system was in no way dogmatic. A diary entry from 1814-5 entitled Terminologia botanica repeats the widely held complaint against the Linnean system that it is not actually grounded in nature (Ritter, 1814-5, p. 58).

Salzmann also sought to educate children in as much isolation from the corrupting influence of human society as possible. The concept of human society was taught through practice—through practical physical work and division of labour within the community of his institute. Like Rousseau, Salzmann regarded society as a product of exchange relations and these relations were revealed to students by the fulfilment and conduct of their chores. The truly happy man, an enlightenment concept which contrasts the pietistic concept of service to God, was the man who understood these relations and could independently arrive at valid judgements derived from his own experience. Salzmann’s commitment to the pedagogic use of physical labour also played an important role in relation to his belief in physical exercise as fundamental to the emotional and physical well-being of his students. This idea was systematized by GutsMuths.

Salzmann’s belief in the innate inclination of children to observe nature is derived from his reading of both Basedow and Rousseau. This belief is part of Rousseau’s general theory of childhood as the stage of nature. In this stage children have an inclination for great physical activity which is nature’s way of rapidly developing their organs of perception and their coordinated use. In accordance with

61
Locke's sensationist theory, man was not born with innate ideas, rather he acquired all knowledge through physical sensation, i.e. experience. For Salzmann, proper diet, unencumbering clothing and physical training of the senses were crucial tasks of education and this philosophy was extensively developed by GutsMuths, who established in Schnepfenthal what is recognized as the first German Turnplatz—
gymnastic facility.

Johann C. F. GutsMuths (1759-1839): Physical Education and Geography

GutsMuths was a life-long friend of Ritter.¹ Like Ritter, he came from difficult circumstances brought about by the early death of his father. At the age of eighteen, he was employed as a tutor by the Ritter household upon the recommendation of a gymnasium teacher. Even at this early age, he demonstrated an interest in pedagogic questions and applied the principles of Basedow in his teaching (Grupe, NDB 7:351).

GutsMuths taught with success and was invited by other Quedlinburg families to include their children in his tuition (Kramer, 1875, pp. 14ff). From 1779-1782, GutsMuths studied theology at Halle under Niemeyer. He also attended lectures by Semler and Knapp and read physics, mathematics, history and modern languages. He studied pedagogy under Trapp. He returned to the Ritter household in 1782, where he included the three-year old Carl in his lessons. In Schnepfenthal, GutsMuths taught geography, technology and French and was responsible for physical instruction. He took a special interest in the latter and studied the teachings of the ancient Greeks (harmony of mind and body) as well as the ideas of J.H. Simon, J.J. Du Toit in Dessau, and G.G. Andre a fellow teacher who left Schnepfenthal in 1787. This was the basis for his pioneering work on physical education Gymnastik für die Jugend—Gymnastics for Youths, 1793 (Schröder, 1984, p. 15). He remained in Schnepfenthal until a few months before his death in 1839.

Like Salzmann, GutsMuths was deeply influenced by the sensationist theory of Locke whom he cites in his Gymnastik. In his section on Cultivation of the Senses, he remarks that Locke clearly demonstrated that none of our ideas is innate, rather ideas are acquired through the medium of the senses (GutsMuths, 1793, tr.,1800, p. 381). Hence the development of the senses is crucial to any system of education. GutsMuths divides experience, or perception into immediate and mediate categories.

¹Selected correspondence is reprinted in Plewe, 1959 and Kramer, 1875.
Immediate perception is direct physical experience of an idea, e.g. heat. In contrast, mediate perception is conditioned by the internal process of reason. Education can be achieved only by collecting immediate sensual ideas. Only after the mind is stocked with such ideas can instruction in conceptual thought begin. Reading is meaningless until a student has simple ideas to work with because reading consists only of mediated thoughts (Ibid., p. 396). GutsMuths held the belief that rigorous physical training might lead also to the discovery of as yet undeveloped and unrecognized human senses. He cites Herder's suggestion in the Iden, 1784, that "...undiscovered worlds of variety and perfection may lie asleep in other senses, not yet developed in our complex machine (Ibid., p. 381). GutsMuths also wrote several instructional books on useful games and activities for youths, including a work on swimming Kleines Lehrbuch der Schwimmkunst—A Short Guide to Swimming, 1797, which also is described as a pioneering work (Schröder, 1984, p. 19).

The relationship of GutsMuths to the later emergence of the intensely nationalistic German Turnerschaft—Gymnast movement, that was founded by F.L. (Father) Jahn and emphasized fraternity and physical training for service to the Fatherland is uncertain. From the first publication of his Gymnastik in 1793, GutsMuths promoted a German corporeal culture (Leibeskultur) after the model of the Greeks, but Jahn's thinking which was inspired by Fichte's Reden an die deutsche Nation—Speeches to the German Nation, 1806 appears to have been specifically directed to the promotion of German nationalism (Kohn, 1960, re., 1965, pp. 84-6). GutsMuths wrote in a nationalist spirit in his Turnbuch für die Söhne des Vaterlandes—Gymnastics for the Sons of the Fatherland, 1817, but this followed Jahn's Die deutsche Turnkunst—the German Gymnasts, published a year earlier which suggests that GutsMuths was at least moved in the same direction as Jahn by virtue of the same great connection to the time (Kämmel, ADB 10: 225). GutsMuths wrote in a nationalist spirit in his "Über Vaterland," 1814 and with J.A.Jacobi in Deutsches Land und deutsches Volk, 1821, but the incorporation of physical education into German nationalism was not the obvious intent of GutsMuths' early pedagogic oriented thinking during the period of Ritter's training in Schnepfenthal.

GutsMuths also possessed a keen interest in geography, in fact, Ritter's biographer Kramer reports that as a child, GutsMuths would almost daily climb onto the roof of his family home and spend hours looking around at the gardens and at the
Harz Mountains in the distance (Kramer, 1875, pp. 14ff). He had an aptitude for drawing which he put to the service of geography as a teacher. GutsMuths also exerted an important early influence on Ritter's geographic thinking. In GutsMuths' teaching a strong link was forged between natural history and geography by virtue of the emphasis on field trips, collecting, drawing and mapping. The *concentric circle system* derived from Rousseau's natural method was an important component of instruction. In this system students were taught by observing first what lay in their immediate vicinity. Their *Gesichtskreise*—mental horizon, was then incrementally increased thereby raising their consciousness of scale and diversity. Salzmann himself writes that after two years of natural history instruction there should be no plant or animal within a two-mile circumference that is unknown to his students. Animals were described within the context of their habitat and means of subsistence (Rommel, 1984, p. 24). Knowledge so acquired could then form a basis from which to compare and judge phenomena from other areas. Field trips were crucial in instruction and GutsMuths as a geographic instructor taught students to prepare for such trips by carefully examining maps, which were often handcopied by the students, in order to note who possessed the lands through which they would pass, their products, populations, cities, rivers, lakes, noteworthy mountainous areas and forests (H. Richter, 1983, p. 87). Ritter was quite enthusiastic about these studies and at the age of nine expressed a desire to become a Professor of Geography (Kramer, 1875, p. 29). Despite this enthusiasm, geographic thinking in Schnepfenthal had not yet broken the mould of the eighteenth-century tradition.

GutsMuths' pedagogic approach to geographic instruction was very practical and treated the earth and universe as a holistic system. He understood the theory which underlay the synthetic approach to knowledge that was fundamental to the concentric circle system, but after some years of experience, GutsMuths argued that an analytical approach to geographical instruction was necessary. Instead of attempting to construct the whole by assembly of its parts, he suggested that the whole should be assumed and then dissected (GutsMuths, 1811, p. 305). His main fear was that without an initial view of the whole, students would construct erroneous wholes from the limited horizons of their experience, or would erroneously come to see continents or countries as wholes in themselves (GutsMuths, 1811, p. 302). The view he held during Ritter's years in Schnepfenthal is not certain, but it was a question which was raised much earlier by Rousseau in connection with geographic instruction in his *Émile*. Ritter's
later view was clearly synthetic (Ritter, 1806, pp. 203ff). Likewise, H. Richter ascribes to GutsMuths a more practical, less idealistic, and less deterministic view of geography in comparison with Ritter (Richter, 1983, p. 85ff). GutsMuths' views on geographic pedagogy are distributed over a lifetime of writing. His most important geographic works include: *Lehrbuch der Geographie*, 1810, 2nd ed., 1825; *Abriß der Erdbeschreibung*, 1819, 3rd ed., 1839; and his *Versuch einer Methodik des geographischen Unterrichts*, 1835. GutsMuths is also remembered for providing a valuable pedagogical forum by establishing and editing the *Bibliothek für Pädagogik* which appeared under different names between 1800-1820. This is the journal where Ritter published his early, and quite revealing, views of geography both as a pedagogic system and as a synthetic system of science (Ritter, 1806, pp. 203ff).

The extent to which Ritter formally took part in Salzmann's and GutsMuths' thinking in these early years is linked to his intellectual preparedness to receive such ideas in a meaningful way. GutsMuths and Ritter shared the same living quarters and Ritter's access to GutsMuths was of an immediate and familial kind, but it was Salzmann who acted as the father figure for Ritter. GutsMuths closely supervised his study and assessed his progress as is indicated by his correspondence with Ritter's mother. He enforced Salzmann's rule that each student must record what he had learned each day in a personal diary. Ritter learned much by example. As the years progressed, Ritter played an increasingly important role as discussion leader on field trips and in supervising physical training and chores around the school. GutsMuths' energy and industry was matched by Ritter who worked sufficiently hard in all areas of training to earn the institute's *Ordens des Fleißes*--Order of Diligence.

In his final period of training in Schnepfenthal in preparation for study in Halle (Winter 1795/96), Ritter undertook actual daily instruction in the institute and met with Salzmann on a regular basis to discuss pedagogic problems (Kramer, 1875, pp. 36-7). There is little doubt that he would have discussed new ideas with GutsMuths. Consequently when Ritter left Schepfenthal on October 4, 1796, he brought to his pedagogic studies in Halle not only a sound education, but also a formal introduction

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*There is no record of Ritter's diaries from this period in the Salzmann Institute in Schnepfenthal, the Klopstock House in Quedlinburg, or the Ritter Archives at the University of Freiburg. They may be among the items which were destroyed in Berlin in World War II.*
Figure 3.1
Carl Ritter as a Youth

Source: Zögner, 1979
to Salzmann's and GutsMuths' pedagogical thinking. This would have included an emphasis on nature, natural history, and the natural system of instruction, as well as in some measure the vocabulary of pedagogic theory and the corresponding psychology. This suggests that Ritter may have understood already the role of comparison in the generation of abstract concepts both practically from its use in the study of natural history and theoretically from his private meetings with Salzmann. The orientation was more empirical (Locke) than rational (Leibniz) and reflected most clearly the influence of Rousseau as mediated through Basedow's terminology.

Less formally Ritter acquired through his early education and upbringing an integrated view of natural history, geography and pedagogy. This integration of elements, especially the conception of human society as the product of exchange relations, and the emphasis on habitat in zoological teaching, suggests that Ritter may have understood mankind in zoological terms, as a series of human groups who are linked like animals to the possibilities of their habitat—a precursive vision of what he later called the economic or zoological part of geographic instruction, or in the Erdkunde, physiological geography (Ritter, 1806, p. 204; 1817, p. 21). In 1882, Ratzel called it anthropogeography. Ritter's upbringing under Salzmann and GutsMuths also emphasized the divine nature of this habitat as well as a pietist obligation to perfect oneself within it. Salzmann's adoption of various enlightened ideas suggests that his educational ideology, if pietistically conceived, was interwoven with a mild but important secularization. It was enlightened pedagogy but it was not in any sense anti-religious or aspiritual. On the contrary, the emphasis that Salzmann placed on divine revelation in nature, and his struggle against unnatural, orthodox education, was a theme central to his educational ideology and a theme which inspires all Ritter's later work. The prevalence in Schnepfenthal of themes which were followed by Ritter in his later geographic work prompted Hanno Beck to write:

Ohne Schnepfenthal, ohne Salzmanns zielbewuβte Aufbauarbeit ist Ritters späteres geographisches Werk nicht denkbar (Beck, 1979, p. 17).6

The Decision to Study at Halle
As Ritter's years at Schnepfenthal approached an end, there was considerable anxiety and indecision about his future. Ritter expressed the desire to be a teacher and had

6"Without Schnepfenthal, without Salzmann’s calculated preparations, Ritter’s later geographic work is inconceivable."
the support of his stepfather W.G. Zerrenner who married Ritter’s mother in 1788. But financing a university education raised difficulties despite Zerrenner’s willingness to make provisions. GutsMuths and Salzmann concerned that Ritter’s future should be a secure one and knowing the difficulties that young teachers and theologians faced securing respectable positions, encouraged Ritter to employ his practical talents and become apprenticed as a drafter and copper engraver (i.e. cartographic work). Salzmann also had some concern about Ritter’s proficiency in Latin.

In Spring 1795, Ritter had the occasion to meet the wealthy Frankfurter banker J.J. Bethmann-Hollweg through his friend Crecelius, a young tutor from Frankfurt. Hollweg was in Gotha to collect his children who had been sent to the relative safety of the distant city of the Thuringian Basin in the wake of the French Revolution. Hollweg invited Ritter to dinner and Ritter described his wish to attend university and become an educator and explained the problems which that presented. Hollweg was very impressed and offered Ritter financial support for his education in return for Ritter’s commitment to come to Frankfurt and work as a tutor for the Hollweg children. Ritter visited the Hollwegs in Frankfurt and accepted the offer. In the summer of 1795, upon his return from Frankfurt, Ritter wrote that: "Das Hollwegische Haus ist eins von den aufgeklärtesten in Frankfurt" (Kramer, 1875, p. 35). It was also the wealthiest. Hollweg suggested Halle University, perhaps because of his acquaintance with Niemeyer and the possibility of Niemeyer’s assistance in lodging and supervision of Ritter’s studies. These arrangements were satisfactory to all concerned. Halle was a logical choice. Ritter’s stepfather had studied theology in Halle and knew the faculty personally. GutsMuths had also studied in Halle and had attended theological courses under Niemeyer. It was in view of these unique circumstances that Salzmann whole-heartedly supported the plan and began to meet privately with Ritter, sharing his ideas in preparation for Halle.

"The Hollweg house is one of the most enlightened in Frankfurt."
After an uncomfortable twenty-four hour trip by postal wagon, Ritter arrived in Halle at ten o’clock in the evening of October 28th, 1796 and found his way to the Niemeyer home at the Königlichen Pädagogium where accommodation had been arranged. In these years, Halle occupied a strategic cultural location in the midst of Weimar, Jena, Dessau-Wörlitz and Leipzig, an important publishing centre. Halle was also one of the most important educational centres of Brandenburg-Prussia (Holborn, 1964). In addition to the university, the city was host to the Frankeschen Stiftungen—an important school for teacher and missionary education, and the Waisenhaus—an institution for education and pedagogic theory. Consequently it had several small specialist libraries and was an important centre for the dissemination of geographic information by virtue of its collection of missionary reports. J.R. Forster and his son Georg Forster who together accompanied James Cook on his second world voyage were based in Halle as was C.M. Sprengel who worked with Achenwall in Göttingen to edit and publish travel reports and descriptions (Kathe, 1983, pp. 82-3). Ritter’s student years were a transition period for the university. A considerable material expansion of facilities was completed and the university entered a second period of preeminence (Kathe, 1983, p. 81). This culminated in the first decade of the nineteenth century with the nationalistic work of Schleiermacher and Steffins. In the first stages of German nationalism (1806-10), the period of national spiritual renewal, Halle University played a role comparable to the intellectual leadership provided by the University of Berlin in the period of the Wars of Liberation (1813-14) (Pinson, 1934, p. 142). In the closing years of the eighteenth century, Halle became what H. Kathe describes as a "...Paradeuniversität des preußischen Absolutismus"—showpiece university of Prussian absolutism (Kathe, 1983, p. 81).

1 "I leave Halle with much regret, for I owe it a great deal; it made me into another person."
The university was not strictly a pietist institution despite Halle's role as an important pietist centre. Neither was it strictly a school of the enlightenment. The university was founded on a dual tradition. Its creation in the early eighteenth century was the result of the combined efforts of two men: August Herman Franke—one of the founding-fathers of German pietism, and Christian Thomasius—the herald of the German enlightenment. This dual character is described best perhaps by the revealing eighteenth-century witticism that "...he who goes to Halle returns either Pietist or Atheist" (Pinson, 1934, p. 128). In the last decade of the eighteenth century, Halle was still a mixture of the two which expressed itself in the multifaceted ideas of German neohumanism and idealism. The most fundamental philosophical division which Ritter faced in the last decade of the century was the dialogue between the Leibniz-Wolffian school and the new critical school of Kant--both of which were ably represented by the schools' faculty.

August Herman Niemeyer (1754-1828): Practical Pedagogy

Ritter's supervisor during his studies at Halle was A.H. Niemeyer, a great-grandson of Franke. Niemeyer's father was a preacher (Prediger) in the Marienkirche in Halle and Niemeyer continued the tradition with his own theological study. By 1777, he began lecturing at Halle University and became Ordentlicher Professor of Theology in 1784. Niemeyer claims to be descended from a very similar class of Christians in Germany to that of John Wesley. He was not dogmatic and was troubled at times for his liberal theological views. He described his position as neither for or against pietists or anti-pietists as well as other groups such as Methodists or Hemhuters (Niemeyer, in Hampson, 1793, p. xxiii). This neutral position is characteristic of Niemeyer's life and work. Niemeyer was first and foremost an administrator (Binder, ADB 23: 677-79). In 1784, he was inspector of the Königlichen Pädagogiums. In 1785, he was appointed co-director of the Frankeschen Stiftungen, and in 1787, he founded and directed the Pädagogisches Seminar—a group concerned with the theory of instruction and education. In 1808 he refused a call as professor to the newly founded University of Berlin and became chancellor of Halle University.

This successful administrative career, was complemented by a series of important literary projects. He co-edited with J.L. Schulzen and G.S. Knapp Frankens Stiftungen. Eine Zeitschrift zum Besten vaterloser Kinder--Franke's Institutes. A Journal
[Dedicated] to the Best Fatherless Children, Halle, 1792-1798. These works sought to explain the theoretical foundations of the educational institutions derived from Franke’s earlier work. Niemeyer also wrote several works conceived as educational plans for the use of the Frankeschen Stiftung and his pedagogic seminar. Niemeyer’s most influential pedagogic work was *Grundsätze der Erziehung und des Unterrichts für Eltern, Hauslehrer und Erzieher*—Principles of Education and Instruction for Parents, Private Tutors and Educators, 1796.² The work went through eight editions in Niemeyer’s lifetime and a ninth was produced by his son and provided a useful reference work for educators until the end of the nineteenth century (Binder, *ADB* 23: 678). This book was important to Ritter as a general critical guide to the pedagogical literature or as he explained to his stepfather:


As Ritter’s advisor, there is little evidence that Niemeyer sought to indoctrinate him into a particular theory of education; instead, like his critical handbook, he provided general direction. Ritter never felt close to Niemeyer who in accordance with his responsibilities was very formal. But his influence opened many doors for Ritter and facilitated his access to private and public academic materials including the extensive materials of his own library. Siegfried Kirschke asserts that Niemeyer was a Pestalozzi supporter, but in this period before the publication of Pestalozzi’s most important writings, there is little evidence that Niemeyer or Ritter knew much of Pestalozzi (Kirschke, 1980, p. 101). For Ritter, Niemeyer was a proponent of the same basic set of principles which Salzmann had practised for years. Ritter’s knowledge of theory would have been reinforced by his discussions with Niemeyer, but not diverted toward any new or radical direction.

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²This is an outgrowth of his earlier *Pädagogisches Handbuch für Schulmänner und Privaterzieher*, 1790, and was referred to as Niemeyer’s handbook.

³"I have read much with Niemeyer’s handbook always at my side in order to compare, make extracts and repeat the subjects that are most important to me. I could name many books which I have borrowed and read from both Niemeyer’s personal library and the library of the Royal Pedagogium."
Niemeyer's work is written in the spirit of Rousseau and Basedow and emphasises the interdependent development of physical and mental capacities (Rink, 1921, p. 13). It provides a dispassionate guide to disputed questions within the discipline. For example, like GutsMuths, Niemeyer promoted an analytical approach to instruction for strictly practical reasons (Ibid., p. 54).\(^4\) Niemeyer also promoted the primacy of nature as the object of study and suggested that a general education should include precise knowledge of the earth, human history, the products of nature, natural laws, and the most consummate works of human intellect (Niemeyer, 1818, II, p. 60). He also adopted and explained the comparative method of instruction, for he writes:

Das Aufsuchen und Angeben der Gleichheit und Ungleichheit, der Aehnlichkeit und Verschiedenheit, oder das Vergleichen und Unterscheiden, macht eine...sehr nützliche Verstandesiübung aus. Hief[r]bey gehe man...von ganz sinnlichen Gegenständen aus, und lasse angeben, welche Merkmale sie mit einander gemein haben; dann, welche jederm eigenthümlich sind (Niemeyer, 1796, p. 469; compare also 1818, II, p. 71).\(^5\)

He links the process of comparison and differentiation with the revelations of cause and effect (i.e. general laws) which in turn lead to classification and ordering of concepts based on similiarity and dissimilarity (Ibid., p. 472). The entire stepped-series (Stufenfolge) of exercises, which corresponds to what was understood as a stepped-series of childhood capacities (Thätigkeiten), is enumerated by Niemeyer and includes:

1. the awakening of sensual attentiveness (Aufmerksamkeit);
2. the identification of features (Aufsuchen der Merkmale);
3. discussion about origin and use of things;
4. comparing and differentiating (Vergleichen und Unterschieden);
5. first concepts of cause and effect (Ursache und Wirkung)

\(^4\)In the 1818 edition, he argues that the natural method of instruction in geography is the best method from the standpoint of the child, but he notes also, that the analytical method where instruction proceeds from general principles to particular occurrences, is more scientific (Niemeyer, 1818, v.II, p.206). In connection with natural history instruction he also notes that the effectiveness of proceeding synthetically via the natural method is limited because the process is too time consuming (Ibid., p. 260).

\(^5\)"The search for and assertion of equality and inequivalence, of similiarity and dissimilarity, or comparing and differentiating, comprises a...very useful intellectual exercise. Hereby, one begins...from pure sensual objects and asserts which features they have in common with one another, then which features are peculiar to each."
In 1818 edition, Niemeyer cites several pedagogues who have worked in this theoretical area and includes among several others J.H. Campe whom Ritter met in 1806, and Ritter’s stepfather Zerrenner (Niemeyer, 1818, p. 81). The preeminence of Niemeyer’s practical role as a career administrator and promoter of conventional enlightened pedagogy is acknowledged by one of Niemeyer’s contemporaries who wrote:

Erfinder neuer bahnbrechender pädagogischer Systeme war er nicht, aber durch verständige Prüfung, gründliche Erörterung und vorsichtige Benützung des Vorhandenen hat Niemeyer sich große Verdienste auf diesem Gebiete erworben (Jakob in Binder, ADB 23: 679).6

First Academic Semester (Autumn/Winter 1796-7)

Ritter’s chief purpose in Halle was to acquire a pedagogic education, consequently his adoption or rejection of philosophical or scientific ideas was shaped by this agenda. The lectures he attended in his first semester in Halle were according to his own words: "...ganz auf Pädagogik und Cameralwissenschaft zielten"—aimed entirely toward pedagogy and cameralism (Ritter to Johannes, 1796, in Kramer, 1875, p. 45). He formally matriculated as a student of cameral science or what might be understood today as public administration. It was normally a three-year course and included studies in law, natural science, mathematics, statistics, history and engineering. Ritter’s study was of two-years duration and was not as broad (Kathe, 1983, p. 82), nor did he obtain a special degree. Despite his abbreviated programme of study, the lectures he attended covered a wide range of contemporary topics. These reached from physics to aesthetics, Italian to geography, theology to statistics, and other subjects. Unfortunately Ritter did not have the opportunity to study mathematics formally. But he gained considerable theoretical knowledge from Halle and examined the logical foundations of many newly emerging sciences such as chemistry, physics, aesthetics and linguistics. This was an especially important element in his training because his introduction to

6 "He was not a discoverer of new pathbreaking pedagogical systems. However, he did a great service to this discipline through his knowledgeable examination, basic discussions and careful use of existing systems."
history and geography by Christian Sprengel was noticeably devoid of a similar logical foundation. Ritter observed this disparity, but it is unknown whether he consciously considered the possibility of providing a rigorous logical foundation for Geography during his years in Halle. This disparity is best illustrated by examining the sequence of ideas Ritter encountered during the course of his study.

Ritter's first semester courses reflect the wide variety of subjects that characterize the entire period of his studies. These include:

1) Introduction to Cameral Science (Rüdiger);
2) Landbaukunst (Civil Engineering) (Meinert);
3) Aesthetics (Eberhard);
4) Logic and Metaphysics (Jakob);
5) European State History (Sprengel).

The first two courses are of less interest, although Ritter enjoyed the opportunity to develop his drawing skills in the practical engineering course. In Cameralism, J.C. Rüdiger professed a somewhat dated set of conservative ideas which were apologetic for Prussian absolutism (Kathe, 1983, p. 82). In 1795, he explained that he was too old to think about the new teachings of the physiocrats and Adam Smith (Ibid., p. 82). His teachings are summed up in his *Anfangsgründe der allgemeinen Staatslehre mit einem kurzen Lehrbegriff der ökonomischen Policey*—Fundamentals of General Government with a Short Theory of Economic Policy, 1795. Cameralism in Halle was stagnating and was not revitalized until the first decade of the nineteenth century when L.H. Jakob turned his efforts from promoting Kant to developing a theory of government (Prantl., *ADB* 13: 689-90). The latter three sets of lectures were of greater long-term importance to Ritter and were a source of current ideas and issues. It is both interesting and revealing that Ritter, in assessing his first semester, wrote "Am besten gefällt mir Eberhard's Vortrag in der Aesthetik"—I liked best Eberhard's lectures in aesthetics (Ritter to Johannes, 1796, Kramer, 1875, p. 46).

**Johann August Eberhard (1739-1809): Leibniz-Wolffian Aesthetics**

Eberhard was trained within the Leibniz-Wolffian tradition which Wolff had established in Halle in the mid-eighteenth century. Like his teacher Baumgarten, Eberhard sought to apply the principles of reason to aesthetics in order to raise it to the status of
science (Richter, ADB 5: 570). His logic is expounded in Allgemeine Theorie des Denkens und Empfindens—General Theory of Thought and Sensation, 1776, which was awarded a prize by the Berlin Academy, and his application of this logic to aesthetics was developed in his Theorie der schönen Wissenschaften—Theory of the Fine Sciences, 1783. It was the third edition (1790) of this latter work that formed the basis for the lectures Ritter attended in spring 1797. Ritter recorded these lectures in his student notebook and his notes provide evidence of his formal exposure to the logic and terminology of the Leibniz-Wolffian system of logic (Ritter, 1797).

Like Baumgarten, Eberhard’s aesthetic theory approached the principles of taste and the understanding of beauty as an alternate route to the divine. In contrast to the Kantian system that emphasised form, the Leibniz-Wolffian system postulated material as the foundation of existence. God was equivalent to material extension and was in an idealistic sense, experiential. Other theologians looked to nature for divine revelation but were moving towards a realization that an all-embracing view of the infinite whole might not be possible. Eberhard’s teacher Semler looked deeper into the Bible for revelation by applying rational philological analysis. In contrast to these approaches, Eberhard attempted to extract divine revelation from logical analysis of the inherent beauty in nature and the consummate works of man—a powerful motivating force which led to his formal rejection of Kant’s critical philosophy.

In Eberhard’s aesthetic system beauty was measured logically in accordance with a continuous scale of absolute (unbedingt) and relative (bedingt) perfection (Vollkommenheit). One such hierarchical series recorded in Ritter’s notebook includes: (1) Edle—noble; (2) Feyerlich[e]—solemn; (3) majestatische—majestic; and (4) Erhabene—sublime (Ritter, 1797, section F.1.2). This scale was linked in turn to levels of clarity or distinctness in sensual and moral expression. Under the heading of theoretical aesthetics, Ritter’s notes include specific definitions for these logical terms:

Klarheit besteht in der Lebhaftigkeit und in dem Grade d[er] Deutlichkeit ...Deutlichkeit besteht in d[er] Klarheit der Merkmale. Lebhaftigkeit für die Künste ist [sind] solche Klarheit[en] welche die Sitte fragiren und von der Menge der Merkmale abhängen (Ibid., section F.1.3).7

7"Clarity consists in vividness and degree of distinctness … Distinctness consists in the clarity of features. For the arts, vividness is those clarities that question tradition and are dependent on the multitude of features."

75
The terminology recorded here by Ritter is an unmistakable derivative from the Leibniz-Wolffian logical system where clarity is achieved by resolution of objects into their component features (Merkmale).

Kant did not criticize Eberhard’s logical diction, but rather focussed criticism on its misapplication and the misuse of the term aesthetics to denote taste. Kant uses the term in its limited classical sense to denote the principles or laws of physical sensation as in his transcendental aesthetic. He argued that the attempt to raise aesthetics to a logical science was flawed because the logical principles employed are empirical whereas the judgement of beauty is subject only to a priori transcendental laws (Kant, 1787, re., 1985, p. 82). Eberhard rejected this argument and described the critical philosophy as incomplete and merely another form of dogma (Richter, ADB 5: 570). To promote this view, he established two journals as an anti-Kantian forum: Das Philosophische Magazin, 4 vols., 1787-95; and Philosophisches Archiv, 2 vols., 1793-95. He was the chief contributor and his argument that a critique of reason existed already in Leibniz’s work provoked Kant to write his Ueber eine neue Entwicklung, durch die alle neue Kritik der reinen Vernunft—Concerning a New Development through the New Critique of Pure Reason, 1791 (Kant, 1791, p. a.2). Kant’s work systematically refuted each of Eberhard’s arguments. The work was greeted with public acclaim and was detrimental to Eberhard’s standing. During Ritter’s study in Halle, Eberhard began working on other subjects which included a biography of Leibniz, and a philological work. He also sought to popularize his aesthetic theory with his Handbuch der Aesthetik fuer gebildete Leser aller Staende in Briefen—Handbook of Aesthetics for the Educated Readers of all Classes in Letters, 1803-5.

Eberhard exercised an important influence on Ritter both through the substance of his thought and the force of his rhetoric. Ritter writes that Eberhard’s lectures were so lively (lebhaft) and enrapturing (hinreiBend) that he had to make an effort to remember to continue taking notes (Ritter to Johannes, 1797 in Kramer, 1875, p. 46). Siegfried Kirschke observes that Ritter’s later adoption of ideas from Schelling, who shared Eberhard’s dissatisfaction with the Kantian system, reflects Ritter’s failure to find in Kant a philosophy which was consistent with his scientific interests (Kirschke, 1980, p. 106). Indeed, Halle provided Ritter the chance to compare the two systems and he studied Kant’s critical philosophy with one of Kant’s most able proponents.
Ludwig Heinrich Jakob (1759-1827): Kant’s Critical Philosophy

If Ritter struggled with any course in Halle, it was with Jakob’s course of lectures in logic and metaphysics. Ritter himself described the course as: "...ein saueres Stückchen Arbeit"—a small piece of sour work (Ritter, 1796, in Kramer, 1875, p. 45). The lectures themselves were quite lively (lebhaften), but he laments that:

...ich bin so wenig über solche Materien zu denken gewöhnt, daß es mir erstaunliche Mühe macht nur dabei zu bleiben, und ich bemerke, daß es mir nur noch gar zu sehr daran fehlt meine Gedanken zusammen zu halten und nur auf einen Gegenstand zu richten. So brauche ich auch hier zur Repetition die meiste Zeit und Mühe (Ibid., p. 45).

The cause of Ritter’s difficulty was not Jakob’s exposition of the critical philosophy but rather the complexity of its ideas and the critical debates which it spawned. Ritter’s understanding of Kant was not uncritical and was shaped by his concurrent study of Eberhard’s aesthetic philosophy.


8“...I am so little used to thinking about such material that it takes an amazing effort to stick with it. I notice that I am wanting of too much to hold my thoughts together and focus them on one subject. So here too I require the most time and effort for review.”

9“Jakob lectures us presently on Kant’s Critique of Pure Reason. Although this explanation of opinions, hypotheses and anti-theses is very agreeable to me, I know definitely that I could not and would not give myself up merely to speculative philosophy. I do not know all the results which are proven and so rigorously explored here. It has not and would not have occurred to me either to doubt these results or believe them to be true. Only now that I have heard the main part[s] of this critique, can I understand how it is possible for a sound human understanding, by such criticism and argument, to move away from the truth which one is in position to instantly understand.”

77
Jakob, like Eberhard, was educated at Halle (1777-79) where he studied philology, theology, pedagogy and philosophy. He was twenty years Eberhard's junior and was not as directly influenced by Christian Wolff who taught in Halle in the early mid-eighteenth century. Jakob became one of the most important proponents of Kantian philosophy and is remembered for his popularization of it for the common good (Prantl., ADB 13: 689). From 1795-97, Jakob edited the *Annalen der Philosophie* which provided an organ for voices raised against the idealistic philosophy of Fichte and Schelling both of whom were dissatisfied with the foundation Kant established for science and who sought therefore to extend and refine Kant's system. It was argued that the general complexity of Kant's *Critik der reinen Vernunft*—Critique of Pure Reason, 1781, was the root of such misguided interpretation and application that attributed idealism to Kant's thinking. The purpose of the second edition of the *Critik* (1787) was not merely simplification of the exposition, but the refutation of idealism (Kant, 1787, re., 1985, pp. 303ff).

Jakob's version of Kant, in opposition to the thinking of Eberhard, Fichte and Schelling, was much closer to Kant's original intent, which emphasised the inapplicability of pure reason to non-experiential metaphysical ideas. It is perhaps this problem of conflicting interpretations which prevented Ritter from venturing very far into speculative philosophy despite a later inclination towards metaphysical reasoning. Ritter's ontological principles were based on the authority of others, rather than his own systematic philosophical investigations. Ritter's later writings demonstrate that he possessed an active working knowledge of Kantian terminology and thinking--this is true especially of his earliest pre-Pestalozzi works of 1804 and 1806, but as Siegfried Kirschke correctly points out, Ritter looked elsewhere for the philosophical foundation of science (Kirschke, 1980, p. 106). Specifically, he adopted Fichte's and Schelling's views as mediated through the Pestalozzi Circle.

There is much in Kant's system that was directly relevant to Ritter's pedagogic thinking. This includes both Kant's critique of physicotheology as well as his system of logic which was the specific focus of Jakob's course. In pedagogic respects, the logic which Ritter studied under Jakob was not very different from the Leibniz-Wolffian logic as developed by Basedow or the Lockean logic that was applied by Salzmann and GutsMuths in Schnepfenthal. Jakob himself had studied pedagogy. The logic is revealed not only in Jakob's *Grundriß der allgemeinen Logik*--Foundation of
General Logic, 2nd ed., 1791, which formed the basis for his course, but also in Ritter's personal notebook for the class which refers to corresponding paragraph numbers from this text. Of specific interest, are his notations regarding the logical process of comparison.

The Vocabulary of Jakob's Kantian Logic
Kant's critical system has two main components: (1) the transcendental aesthetic which systematizes the elements and principles of sensibility; and (2) the transcendental logic which systematizes the elements and principles of reason. Transcendental logic is further divided into analytical and synthetical operations. Analysis was important for Kant but only as means for acquiring the distinctness (Deutlichkeit) of concept necessary for continued synthesis which was the basis for the generation of real knowledge (Kant, 1787, re. 1985, pp. 58ff., esp. p. 63). The process of synthesis was therefore a central feature of the logical structure of knowledge, and like Locke and Leibniz it was an inductive process which employed the mental faculty of comparison and abstraction in order to create general concepts. Reason reduced the multitude of cognitions (Erkenntnis) to the smallest possible number of general conditions (allgemeiner Bedingungen) and thereby produced the highest possible logical unity (Ibid., p. 386). Reason was not a source of knowledge itself, but a subordinate faculty, which gives logical form to conditions and which subordinates concepts to one another another by comparison (Ibid., pp. 386-87).

Jakob defines comparison (Vergleichung) as a mental process (Handlung des Verstandes) whereby attention (Achtung) is focussed on the uniqueness (Einerleiheit) and differences (Verschiedenheit) of a collection of ideas (Vorstellungen--mental images) (Jakob, 1791, §185). When this happens, those features which are identical and common to the ideas (Vorstellungen) are abstracted into new independent concepts (Begriff) (Ibid., §186). These concepts can then be considered in their own right and analysed, or can form the basis for further conceptual abstraction (Ibid., §187). In his class notebook (see Figure 4.1), Ritter recorded this process as the "...logische Bildung d[er] Begriffe"--logical construction of concepts (Ritter, 1796, p. 4). He identifies those mental processes which belong to conceptual construction as the comparison of ideas (Vergleichung d[er] Vorstellungen) which consists in "...d[er] Aufmerksamkeit auf die Einerleyheiten oder Verschiedenheiten d[er] Dinge"--attention to the uniformity or differences of things (Ibid., p. 4). This leads to the faculty of ordering/distinguishing...
Figure 4-1
Ritter's Notes for Jakob's Logic, 1796

Source: Klopstock Museum, V734-S
(Absonderung) where commonalities are considered together and then abstracted
(Abstraction) into conceptual categories (Gattungsbegriffe) (Ibid., p. 4). The resulting
cONCEPTS can then be defined or determined (Bestimmung) by recognition of the
individual features (Merkmale) and subordinate concepts (niedrigere Begriffe) of which
they are comprised. This process of definition and determination is linked to the
quality of a concept or more precisely its clarity and distinctness. Ritter’s class
notebook includes explanations for the full range of terminology associated with the
Leibniz-Wolffian Helligkeitstheorie.

In Jakob’s system, concepts are either distinct (deutlich) or indistinct
(undeutlich). More precisely there are relative degrees of distinctness which Ritter
records as: (1) clear (klar)—which occurs when one is conscious (bewuBt) of the
immediate features (unmittelbare Merkmale) of a concept; (2) detailed (ausfiihrlich)—
consciousness of the features of the features (Merkmale d[er] Merkmale); (3) complete
(vollstandig)—when one is conscious of the simplest components (einfachsten
Bestandtheile) of features; and (4) fitting or adequate (passend oder adäquat)—when the
consciousness of these features is the most secure (sicherste) (Ibid., p. 7). Likewise
relative degrees of indistinctness are denoted by: (1) obscure (dunkel); (2) confused
(verworren); (3) shaky (schwankend); and (4) shifting (schiebend) (Ibid., pp. 7-8).

This terminology employed by Jakob and recorded by Ritter is not derived from Kant,
but is adopted by Kant and Jakob, with little comment, from the general logical
language of the eighteenth century as created by Leibniz and further developed and
disseminated by Wolff. Jakob’s logic and Kant’s Critik were clearly an important
source for Ritter’s formal exposure to this language.

Holism and the Principle of Continuity
If Ritter actually read Kant’s Critik he would have found other ideas which were of
interest especially in Kant’s critique of physicotheologians and their agenda for
scientific research. In Ritter’s mind, this critique was a direct challenge to the thinking
of his mentors in Schnepfenthal. But despite Kant’s rejection of physicotheology, he
promoted the concept of holism. Holism formed a logically necessary part of Kant’s
transcendental doctrine. Without a holistic unity of nature, nature would be
problematic—it could be conceived, but not experienced (Kant, 1787, re., 1985, p. 340).
In Kant’s own words:
This may be a formal source of Ritter’s adoption of the concept of mutual reciprocity, where nothing can be understood except in connection with the whole. But this thinking was not unique to Kant.

Kant also suggests that the principle of continuity was an important holistic concept which tied experience together and allowed unity of thought (Ibid., pp. 309ff). But he also makes several criticisms of the chain of being in his critique of the physicotheological proof of the existence of God (Ibid., pp. 653ff). Specifically he criticizes the dogmatic view of the chain:


Despite this problem, Kant was unwilling to deny the practical utility of such belief for stimulating and structuring inquiry into nature (Ibid., p. 656)—a pragmatism which also underlies Ritter’s teleology.

Ritter’s notes and letters from this period suggest that he spent considerable time with both Eberhard’s philosophy and Kant’s critique. He acquired from these two thinkers a rudimentary understanding of the most important philosophical issues and

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10 “All phenomena exist in one nature, and must so exist, inasmuch as without this *a priori* unity, no unity of experience, and consequently no determination of objects in experience is possible” (tr. Meiklejohn, 1988, p.164).

11 “If the Supreme Being forms a link in the chain of empirical conditions, it must be a member of the empirical series, and like the lower members which it precedes, requires still farther reaching examination because of its even higher order. If, on the other hand, we disengage it from the chain, and cogitate it as an intelligible being, separate from the series of natural causes—how then can reason bridge the chasm to reach that higher reason?” (modified tr. Meiklejohn, 1988, p. 362).
debates of the time. His notebooks reveal a formal training in the logical vocabulary of the eighteenth century including the role of comparison as a basic faculty of mind and he observed an attempt to apply this logic to a body of knowledge which like geography, was not yet considered a logical science. More peripherally, he was taught to be wary of untrammeled metaphysical speculation, gained an appreciation for the hypothetical limits of reason and the inherent necessity for science to be based on empirical experience. The less-formal understanding of holism which he received as an inherent perspective of his Schnepfenthal education may have been formalized by Kant’s logical commitment to a critical holism which rejected the a priori conception of the chain of being, but which recognized its apparent efficacy in natural science particularly the application of its underlying principle of logical continuity. With the exception of Niemeyer’s moral philosophy lectures, the remainder of Ritter’s course of study in Halle was oriented towards study in practical disciplines. He gained his first insights into the growing geographic literature under Sprengel, he was introduced to the natural sciences by Gren, and he received an understanding of the critical use of language in the philology of August Wolf.

Christian Matthias Sprengel (1746-1803): History and Statistics

Ritter attended lectures from Sprengel in the first and second semesters of study. The courses were of interest to Ritter, but so concrete and so devoid of theory that Ritter was moved to write:

Mit der Geschichte bei Sprengel geht es ganz gut, nur daß er so erstaunlich schnell spricht, und ich immer en carriere nachschreiben muß, da es bloße Facta und sie also schwer in Gedächtnis zu behalten sind. Er macht so wie alle Professoren den Studenten zu Gefallen zuweilen ein Sp(r)äßchen, um viele Gähnende nur zum Lachen zu bringen und zu unterhalten (Ritter, 1796/97 in Kramer, 1875, pp. 45-6).1

The first course focussed on descriptions of political-historical entities such as the American colonies and the Hanseatic League (Ibid., p. 46). In some measure Sprengel’s rhetoric overcame the logical deficiencies of his lectures. Friedrich Ratzel considered Sprengel’s published work as a contribution to the dry (düre) geographic

12"Sprengel’s History is going fine, only he speaks so amazingly fast that I must always write it down en carriere afterwards, because it is all pure facts and hard to keep in memory. As all professors like to do, he makes the occasional joke to make yawning students laugh and keep them entertained."
compendia of the time, but observed that Sprengel’s enormous erudition enabled him to sustain the reader’s interest in the midst of such statistical compilations.


The dryness which Ritter experienced in his history course is hard to imagine in view of the liberal nature of Sprengel’s thinking and the interesting materials that Sprengel so carefully collected and edited. But an emphasis on facts was characteristic of the growing geographic literature that sought to summarize great quantities of information generated by scientific explorations of unknown regions. The summaries were provided often as encyclopedic compendia of statistical tables designed for the special purposes of statesmen and businessmen. Likewise, many historians who wished to integrate this new material into their own discipline, taught history in accordance with administrative boundaries of states. Staatskunde—State Science, emerged as a distinct discipline and formed the foundation for the later development of political geography.

Göttingen was a centre of this development especially through the work of A.F. Büsching (earth description), J.C. Gatterer (history), and G. Achsenwall (statistics) (Denecke, 1987, p. 77). Sprengel, a student of the Göttingen geographer furthered this work considerably in the late eighteenth century. His theoretical ideas are expressed in his introduction to the 1790 edition of Achsenwall’s Statsverfassung [sic] der heutigen vornehmsten Europäischen Reiche und Völker im Grundriß—State Constitutions of the most Eminent Contemporary European States and Peoples in Outline, 1790. This introduction was reprinted as the introduction to Sprengel’s Grundriß der Staatenkunde der vornehmsten europäische Reiche—Outline of State Science of the most Eminent European States, 1793. In the introduction, Staatskunde is defined as Statistik and the state is defined as: the people, the land, and the products (Sprengel, 1790, pp. 3,5). This tripartite definition had a dialectical dimension which

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13"Sprengel’s works reflect an enormous erudition in old, modern and contemporary literature. That bright and practical perception of politically prominent or interesting features, which we find also in the work of his contemporaries especially Büsching and Schlözer, avoids mere dry enumeration as the fruit of his massive reading."
found expression in Ritter's early thinking. Products were brought forth by the interaction of a people and their land (Ritter, 1806a, pp. 203-4). Sprengel conceived the state as a natural entity, as a community of families upon which a state is founded not as a mere administrative institution imposed from the top down (Sprengel, 1790, p. 3). This was a view which Ritter also held, but could be attributed also to the influence of his stepfather Zerrenner. It was a view which was stimulated by those like Gatterrer who promoted the concept of natural boundaries as a means of solving one of the chief problems of statesmanship.

Sprengel was trained in Göttingen under the geographer Schlözer who along with Blumenbach, Heeren and Gatterer, was an important promoter of geographic knowledge in the eighteenth century. Like Halle, Göttingen was an important centre for preparation of scientific travels. Carsten Niebuhr's Arabian trip of 1760 was planned here with the help of T. Mazer and J.D. Michaelis. George Forster and F. Hornemann were associated with this centre (Denecke, 1987, p. 77) and the Göttingen library came to possess an extraordinary collection of scientific travel reports. In 1778, Sprengel became Außerordentlicher Professor in Göttingen and gave public lectures on the British colonies of North America and earned notoriety as an anti-slavery proponent. He was recognized as an international expert on the slave trade and later publicly supported the principles of the French Revolution. Sprengel was a close friend and associate of J.F. Forster and was a public apologist for his son George Forster who provoked hostility throughout Germany including that of his closest associates for his energetic support of the French revolutionary government (Kathe, 1983, p. 82; Dove, ADB 7: 172ff). Sprengel received a call as Ordentlicher Professor of History to Halle University in 1779. He worked closely with the elder Forster, who was a founder of the natural science component of geographical research in Halle (Ibid., p. 82). Sprengel collaborated with Forster on the first three volumes of the *Beiträge zur Völker- und Länderkunde*—Contributions to Ethnology and Regional Geography, 14 vols., 1781-99, which was a compendium of travel reports.

Halle's role as a centre for international information and the planning of expeditions was derived not only from Forster's presence, but also from the missionary

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14 Around 1740, Martin Schmeizel and Johann Zschackwitz lectured in geography in the historico-political way which was oriented to history of the nobility (Fürstenhäusern) (Kathe, 1983, p.83).
training of the Frankeschen Stiftungen. Foreign missionary reports were of especial
importance to Germany where such information, if available at all, was usually
available only in foreign languages, mostly in English and French. Sprengel’s and
Forster’s provision of German language materials was a chief purpose of their
Beiträge, 1781:

Überhaupt werden freilich Nachrichten von unbekannten, oder unbekannt
geworden Ländern, und was von Zeit zu Zeit, Reisende, Seefahrer, und
Topographen, entdeckt und beschrieben haben, wie in andern größern und
kleinem Sammlungen, deutsch mitgetheilt werden. Wir wollen uns aber
vorzüglich auf neue in deutscher Sprache nicht vorhandene Nachrichten
einschränken, und daher bekannte Länder-Beschreibungen weder abkürzen
noch wiederholen (Forster and Sprengel, 1781, pt.1, p. iii).15

This work was continued by Sprengel as Neue Beiträge, 13 vols., 1790-94, and
Auswahl der besten ausländischen geographischen und statistischen Nachrichten—
Selection of the Best Foreign Geographical and Statistical Reports, 1794-1803. This
series ceased publication upon his death in 1803. Sprengel provided an important
service to the faculty of philosophy in Halle by providing them with geographical
information. He also provided much empirical information for the development of
geography despite the form of presentation which Ritter later rejected. After the
completion of Sprengel’s European history course, Ritter attended his lectures in
statistics which, according to Sprengel’s contemporary H. Forster, dealt with the state
in accordance with its "...Beschaffenheit, Regierungs-art, Population, Nahrungsstand,
usw..."—composition, type of government, population and means of subsistence, etc (H.
Forster, 1799 as quoted in Kathe, 1983, p. 82). Despite the mechanical structure of
Sprengel’s statistics, Ritter writes that the course gave him great pleasure.

Das größte Vergnügen unter den Collegien, die ich jetzt höre macht mir
die Statistik, die unser alter barscher Sprengel mit dem größten Eifer
docirt (Ritter, 1797, in Kramer, 1875, p. 47).16

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15"Generally news from unknown or forgotten regions will be reported in German,
that which is discovered and described from time to time, by travellers, seafarers and
topographers, as well as in other larger and smaller collections. But above all, we want
to confine ourselves to reports not available in the German language and neither condense
nor repeat known regional descriptions."

16"The greatest enjoyment in my present coursework is the Statistics which our old
gruff Sprengel lectures with the greatest enthusiasm."
The course was useful to Ritter not only as a means of widening his knowledge of sources of geographical information, but the statistical categories themselves were later adapted by Ritter within a more rigorous logical system. There is little evidence to suggest that Ritter began to think of scientifically reorganizing this information while in Halle, but later, as a pedagogue faced with day to day problems of instruction, the need for reorganization became evident.

The Second Academic Semester (Spring/Summer 1797)

In addition to Sprengel’s statistics lectures, Ritter heard lectures in cameralism, moral philosophy and chemistry. His course schedule in Spring/Summer 1797 included:

1) Sprengel: Statistics;
2) Rüdiger: Police and Financial Administration;
3) Niemeyer: Moral Philosophy;
4) Gren: Chemistry.

Niemeyer’s course in moral philosophy did not make a significant impression on Ritter and did not go beyond the circumference of ideas which Ritter encountered in Schnepfenthal (Kramer, 1875, pp. 44,47). According to Ritter’s biographer G. Kramer, he was not inspired by his other courses in any striking way (Ibid., p. 47). Instead, he gained much pleasure from the few hours he devoted each day to development of his drawing skills which had been exercised in his first semester in Meinert’s Landbaukunst course where the students drew building plans. He was now interested in life drawing. But Ritter also had an interest in science and read scientific publications in the time he allotted each day for the reading of journals and newspapers. These included Usteri’s Medicinische Anthropologie für Nichtärzte—Medicinal Anthropology for Non-Doctors, and Psychologie. It is hard to imagine that he was not inspired by his first systematic exposure to hard science in Gren’s chemistry course or in Gren’s physics which he attended in the next semester and which contained an introduction to geophysics.

Friedrich Karl Gren (1760-1798): Kantian Logic and Dynamism

In 1797, F.A.K. Gren was an important figure in European science. He studied in Halle under Karsten and received doctorates in medicine and philosophy. He was widely recognized through the success of two textbooks which became standard works
throughout Europe. These include his *Handbuch der gesammten Chemie*—Handbook of Collected Chemistry, 1787, which went through four editions, and *Grundriss der Naturlehre*—Foundation of Physics, 1787, which went through six editions and was used as late as the 1820s long after his early death in 1798. Gren also founded and edited the *Annalen* a prestigious journal of physics. Gren’s physics was an all-embracing science which included chemistry, natural history and mathematics or as Gren himself wrote:

> Die Naturgeschichte, die Chemie, und die Mathematik werden also die Grundlage, auf welche man das Gebäude der philosophischen Naturlehre errichten muß (Gren, 1793, p. 11)." 

Gren was also committed to empiricism and sought to develop theory by repeated analytic observation and conceptual synthesis. True natural philosophy arises when the explanation of the diversity of phenomena (Naturbegebenheiten) can be traced back to the simplest primary causes (Grundursachen) (Ibid., p. 7). He also explains that analogical explanation often may be useful, but that it is "...sehr leicht trügerisch, und also nur mit der größten Vorsicht anzuwenden" (Ibid., p. 9). His logical thinking was greatly influenced by Kant’s *Metaphysische Anfangsgründe der Naturwissenschaft*—Metaphysical Foundations for Natural Science, 1786, which promoted the use of his critical philosophy in science. Gren adopts this critical position in his science and also adopts from Kant the *dynamic theory of matter*. This is the basis of his system of chemistry and an important principle which Ritter would have studied.

**Chemistry and Holistic Systems**

Gren carefully delimited the field of chemistry as a scientific discipline, perhaps in response to Kant’s previous rejection of chemistry as a legitimate science (Kant, 1786). Gren argues that there are three primitive physical forces: gravitation, cohesion and expansion and that chemistry deals with the latter two which together comprise the

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17"Natural history, chemistry and mathematics therefore become the foundations upon which the structure of the philosophy of natural science (Naturlehre) must be constructed."

18"...very easily misleading, and therefore to be applied only with the greatest care."

19The *dynamic theory of matter* receives an interesting and useful treatment in Bell, 1984, pp. 123-26, where it is examined in connection with Herder’s theory of *Kräfte*, and in Buchdahl, 1969, pp. 394ff., 491, where it is treated in connection with analogical reasoning as a bridge between mind and matter.
essence of matter (Gren, 1796, tr. 1800, p. 28). In contrast to atomistic definitions which postulate the absolute existence of indivisible, impenetrable atoms, matter is conceived as an equilibrium of dynamic forces which continuously fill a given space. In contrast to the atomists’ definitions of Le Sage and De Luc, Gren defines chemical solution as coextensive interpenetrating extensions of cohesive and expansive forces (Ibid., p. 60). By logically reducing chemistry to these two forces, Gren’s system was reconciled with Kant’s pure conception of science where these two forces are the only ones which can be conceived logically [within the a priori categories of the mind]. This dynamism also facilitates the concept of mutual reciprocity within a holistic system. It explains how all phenomenon can act and react upon one another continuously and in simultaneity. Dynamic forces form a common substratum of experience. This suggests too that the forces of mind and nature cannot be separated absolutely. Indeed it is their interdependence in experience which Kant so methodically explored in his critical philosophy.

Natural History and Continuity
Consistent with Gren’s adoption of the dynamic view, is his use of the principle of continuity in a holistically conceived nature. He applies the principle as an ordering device and as an explanatory aid in understanding the relationship between the main divisions of physical nature or what he identifies as the fixed and fluid forms of the earth—i.e. the lithosphere, and the hydro- and atmospheres. He observes that there is no absolute contrast between these, but rather many intermediate forms.

Solche Körper...doch aber als ein zusammenhängen des Ganzes erscheinen. Beide sind durch keine genaue und scharfe Gränzlinie von einander abgesondert, und die Consistenz geht durch viele Zwischenstufen zwischen Festigkeit und Flüssigkeit hindurch (Gren, 1793, p. 84).20

In his discussion of the mineral kingdom, he acknowledges the efficacy of the chain of being as an ordering device and observes that only recently had it been applied to chemical problems.

Erst in der neuesten Epoche der Naturlehre hat man angefangen, mehrere Erfahrungen mit Genauigkeit und Sorgfalt hierüber zu sammeln, und in

20"Such bodies...certainly appear however as an interconnected whole. Both are not separated from one another by precise and sharply defined borders, rather the consistency/viscosity goes through many intermediate steps between solidity and fluidity."
Like analogical reasoning, Gren’s use of the stepladder in nature as a *natural system* of classification is not dogmatic or uncritical. For example, he suggests that there is no similar system for classifying salts.

Da überhaupt die Natur die Körper nicht nach einem System erschuf, da die Stufenfolge der Wesen und die Classification derselben nur subjectiv ist, da es kein natürliches System der Körper gibt, so müssen wir durch künstliche Gränzlinie die natürlichen Körper von einander zu unterscheiden suchen (Ibid., p. 256).

Despite this observation, Gren is not willing to surrender continuity as a practical tool of research and he employs it in his consideration of the earth’s surface features.

Examination of the earth is the most important aim of Gren’s physics. He devotes an extended final chapter of his textbook this aim (Ibid., pp. 735-94). The chapter provides an excellent guide to the scientific literature of this period and reviews many of the current theories. Gren had an interest in understanding the structure of the earth as a single system. Especially important for Ritter, is his discussions of Philippe Bauche’s theory of the terrestrial unity and continuity of mountain chains, and G.A. Werner’s diluvialist theory (Gren, 1793, pp. 735-39). Both of these theories find expression in Ritter’s early work (Ritter, 1806b).

Philippe Bauche’s theory of the interconnectedness of all mountain chains throughout the world has very ancient components. Seneca may have been the first to suggest an "...analogy between the anatomy of man and the mountains as the bone structure of the earth..." (Nisbet, 1970, p. 27). Leonardo also referred to the mountains as "...the bones of the earth" (Ibid., p. 167). Other proponents of this thinking

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21"Only in the most recent period of natural science, has one begun to collect empirical knowledge with precision and care, and connect these simple elective affinities in tables or stepladders."

22"Because generally, nature has not created (erschuf) the bodies according to a system, because the stepped-sequence of being and its classification is only subjective, because there is no natural system of bodies, we must try to differentiate the natural bodies through artificial lines of demarcation."
included: al-Biruni (eleventh century); Jacob Perex (fifteenth century); the Jesuit Athanasius Kircher (seventeenth century); Bernhard Varenius (1650); and in Bauche’s own time, G.L. Buffon (Lagarde, 1985, p. 23). This organic analogical view was promoted vigorously by Herder (Nisbet, 1970, p. 167). By the last decade of the eighteenth century a complex system of interconnection gave rise to an orographic partitioning of the earth in accordance with an elaborate theoretical system of mountain parallels and nets. Gren was sceptical that such regular arrangements of mountain ranges could be established, but he did not reject Bauche’s hypothesis itself (Gren, 1793, p. 736).

Gren understood mountains and most rocks as chemical precipitates of a primordial ocean. This was the Wernerian view which had many followers in the eighteenth century and was further advanced by his students Alexander von Humboldt, Leopold von Buch and others from his Freiburg Academy. Gren does not elaborate diluvialist theory in his text, but he cites G.S. Pallas’ *Observations sur la formation des montagnes—Observation on the Formation of Mountains*, 1777, and G.A. Werner’s *Neue Theorie von der Entstehung der Gänze—New Theories about the Evolution of the Whole*, 1791, which were recognized as chief sources of this concept. During the *Basalt Controversy*, Gren postulated, like Karsten and Widemann, an aqueous origin for the basalt columns of Ireland’s Giant’s Causeway in contrast to the vulcanist view (Gren, 1793, p. 747; Wells, 1978, pp. 62ff). Gren also adopted Werner’s system of mountain and rock classification which included: (1) primordial (uranfähiglich); (2) stratified (Flötzgebirge); (3) depositional (aufgeschwemmt); and (4) volcanic. These were understood as a sequentially precipitated continuous series, with the exception of volcanic materials which were not part of the aqueous system. Such a continuous hierarchy of types also characterized mineralogical classification. Like Werner, Gren rejected the older system which groups mountains into Hoch-, Mittel-, and Vorgebirge—high mountains, intermediate mountains, and foothills. He argues that these are superfluous because these categories did not arise from an understanding of the inner construction of mountains (Ibid., p. 738).

Ritter was exposed to a broad range of scientific ideas in Gren’s courses. In addition to a holistic dynamic theory of matter, Ritter was taught to apply Kant’s critical logic to the foundation of chemistry as a formal science. Ritter also observed the critical application of the principle of continuity as a natural system of
classification in physical theory and natural history. He was introduced to diluvialist thinking, the associated method of mountain and rock classification, as well as Gren's rejection of the old system of mountain classification. Many of these ideas find expression in Ritter’s later writings but are most apparent in the arrangement and accompanying discussions of his *Sechs Karten*, which was produced in the period 1802-06. In Halle, Ritter continued to study independently Sprengel’s history and geography. It is not certain if he realized the possibility of developing traditional geography into a formal science by the application of a logical system, but by the end of the second academic semester, the components of such a logic and the materials to be assembled were readily available, as was his confessed failure to remember Sprengel’s massive collection of unsystematized facts.

**Third Academic Semester (Autumn/Winter 1797-98)**

In his third semester, Ritter continued Gren’s and Niemeyer’s lecture sequences, but also began Italian instruction and classical history and literature under F.A. Wolf, the so-called "prince of philology" (Baumeister, *ADB* 43: 742). Ritter’s schedule included:

1) Niemeyer: Moral Philosophy;  
2) Gren: Physics and Chemistry;  
3) Wolf: Roman History;  
4) unidentified lector of the university: Italian.

Ritter was preoccupied with science at this time and was greatly disappointed that a mathematics seminar could not be arranged, but he continued independent study in geography, statistics and history in accordance with Sprengel’s approach (Kramer, 1875, p. 48). He cites this independent study in a letter written to his brother who worked for the Nicolaischen Buchhandlung in Berlin.

> Ich weiß, wie oft bei Euch im Buchladen Karten, Risse, Tabellen u. dgl. mehr verpackt wird [werden].... Gerade dies schlägt in mein Fach und kann mir bei meinen Arbeiten in geographischer, statistischer-historischer Hinsicht zuweilen sehr willkommen sein (Ritter to his brother, 1798, in Kramer, 1875, p. 48).

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23"I know how often you pack up maps, sketches, tables and other related items in your work at the bookstore. This strikes close to home in the area of my interest and can be very welcome to my work in geographic, statistical and historic respects."
Despite this scientific interest, Ritter developed a life-long interest in the works of classical antiquity and wrote treatises on classical subjects (e.g. Ritter, 1812, 1820). Ritter also incorporated the classics into his private tutorial work in Frankfurt. In Halle, Ritter could not have received a better introduction to classical studies than the introduction he received from F.A. Wolf whose work included contributions to the pedagogy of classical studies, as well as to the theories of classical philology itself.

Friedrich August Wolf (1759-1824): Classicism, Philology and the Critical Interpretation of Language

F.A. Wolf was an important exponent of German neohumanism as embodied in the period of German classicism (1785-1805). He was the founder of a new classical science which idealized the Greeks and sought to revive the ancient concept of "humanitas" (Holborn, 1964, re., 1982, p. 324). He built on the aesthetic humanism of J.J. Winckelmann, based on a spiritually conceived Platonic monism and incorporated in a highly idealistic philosophy (Ibid., p. 324). The Greeks were understood by the neohumanists as having embodied in their art, the "ideal forms of nature" and thereby revealed the "reality of the eternal" (Ibid., p. 322). Rational or moral truth was elusive, but the idea of beauty existed in actual works of art. Art was raised to an autonomous body of knowledge which was not accessible to pure rationality, but rather to "intuition" (Ibid., p. 323).

The sensuous and spiritual faculties of man together opened access to the work of art. This "inner sense," as Winckelmann called it, was a desire which...aimed at...experiencing the appearance of the absolute in the sensual...[a] longing for the invisible world of absolute forms (Holborn, 1964, re. 1982, p. 323).

In the classical movement Greek ideals were elevated above Christian religion and during the early romantic period (1790-1806), the movement developed a pagan character as exemplified in the thought of Goethe and Wilhelm von Humboldt (Ibid., pp. 477-79). Wolf was a student of Semler who subjected the Bible to a dispassionate historical and philological criticism. In the last quarter of the eighteenth century, Wolf subjected the works of classical antiquity to the same type of scrutiny.

As an historian, Wolf also followed the nationalistic component in Winckelmann's theory which argued the existence of national genius (Holborn, 1964, re., 1982, p. 323). Like Winckelmann, Wolf believed Greek art to be superior to that of the Romans. Art was not merely an embodiment of idealized natural forms, but
also a moral embodiment of the civilization from which it arose. Wolf was cognizant of Herder's theory of the aesthetic supremacy of *Urpoesie*—folk poetry, as a natural organic outgrowth of folk-groups and he knew of Herder's pronouncement that Roman literature lacked such an outgrowth. He argued that the literary supremacy of Greek civilization was derived from the moral excellence of the individual peoples who made up the Greek states (Schick, 1971, pp. 40ff). In 1797/8 when Ritter studied Roman and then Greek literary history Wolf was in the "...vollen Kraft seiner weitreichenden, Epoche machenden Wirksamkeit"—the full force of his far-reaching epoch-making effectiveness (Kramer, 1875, p. 44). Wolf's Greek literary history was the cause of his notoriety and Ritter would have been exposed to the controversy that raged after the publication of Wolf's *Prolegomena ad Homerum* in 1795. The central argument of this work concludes through careful philological analysis, that Homer could not have written the *Odyssey* or the *Iliad* because stylistically the works were not of Homer's age. Wolf's colleagues were dumbfounded and Herder who had not carefully examined the work criticized it as a mere extension of his own theory of *Urpoesie* (Baumeister *ADB* 43: 743-4). Eventually the full implications of Wolf's work was recognized and his reputation as an important classical authority was established.

Wolf also had pedagogic interests. He worked with W. von Humboldt to establish a national system of education for the Prussian state in the first decade of the nineteenth century. Wolf's pedagogy promoted the theory of *Selbstthätigkeit*—self-learning which promoted independent study. His pedagogic ideas were given practical form in *Platon's Gastmahl, mit Einleitung und Anmerkungen in deutscher Sprache*,--Plato's Symposium, with Introduction and Remarks in German, 1782. The work was commissioned by Minister von Zedlitz at the direction of Friedrich the Great, in order to develop a general method for learned instruction of ancient writers. Wolf's system emphasizes logical and rhetorical content analysis (Baumeister, *ADB* 43:740). Humanities, in the sense of classical antiquity, formed the foundation for all higher development. His system stood in opposition to the natural based system of the Philanthropium, but it had a naturalness, freshness, and moderateness, which distinguished it from strict conventional pedantry (Ibid., p. 748).

The most important elements of Wolf's thinking for Ritter's development are also the most basic. Aside from an introduction to classical literature, it is likely that Ritter would have been introduced to an idealistic aesthetic interpretation of Greek art
in contrast to Eberhard's rationalist aesthetic. It is also likely that he was introduced
to the distinction between Roman and Greek literature based on Herder's theory of
Urpoesie. More importantly, Ritter may have gained an important appreciation for the
distinction between Urpoesie and careful philological analysis—that is a critical
approach to the historical and stylistic use of language. Pedagogically, Ritter may
have known of Wolf's views, but nothing is known of his reaction to such thinking
after his naturally based education in Schnepfenthal. Ritter would not have found his
idea of Selbstthätigkeit objectionable, especially in the setting of a national education,
but Wolf's assertion of an education that is rooted in classics instead of nature is a
system that was alien to Ritter's entire outlook. According to Kramer, there is no
indication what impression Wolf and his lectures made on Ritter (Ibid., p. 44).

Final Academic Semester (Spring/Summer 1798)
The details of Ritter's studies in the last semester in Halle are not precisely known
except that they were devoted primarily to pedagogic studies presumably under
Niemeyer but possibly also under Nösselt. In the spring, Ritter probably continued his
practice of continuous revision as well as his own independent readings. But these
studies were interrupted by a trip to Berlin in July in the company of his parents to
pay homage to King Friedrich Wilhelm III who upon accession to the throne in the
previous year had lifted the Wöllerschen Religionsedict. There was great optimism in
Berlin and for Ritter this was supplemented by the pleasure of seeing his brother for
the first time in two years. Ritter returned to Halle and remained there until mid-
September.

Ritter received a broad range of ideas while in Halle many of which found
expression in his later geographic works. For example he adopts Bauche's theory in
his earliest works (1804, p. vii; 1806b, p. 160), but rejects the theory later as mere
hypothesis (1817, pp. 13; 66-7). Ritter also adopts the diluvialist precipitation theory
and cites Werner's theory of the uniformity of mineral successions throughout the earth
(1806b, p. 13; 1817, pp. 34-5). Sprengel's view of the state as an organic outgrowth
of a people also finds expression in Ritter's earliest geographic work (1804, p. vi) as
do his statistical categories which after years of study receive sophisticated expression
in Ritter's anthropogeographic concept of physiological geography (1817, p. 21) and
form the elements (Momente) for comparison. This concept was reinforced by Ritter's
adoption of Herder's Humanitätsidee and Urpoesie which postulate unique individual
characters and destinies for human groups. These elements are fundamental to the nationalistic ideas which pervade the introduction to Ritter’s *Erdkunde*.

Ritter’s later work also reflects his familiarity with eighteenth-century logical systems. There is no evidence to suggest that at Halle Ritter was conscious of the possibility of raising geography to the status of a science by the application of formal logic, despite the work of Eberhard, Gren and Wolf, all of whom sought to give their disciplines a logical scientific foundation. Ritter’s later development of geography as a logical science followed the same pattern as the other sciences and was based partly on a synthetic inductive system common to both the Kantian and Leibniz-Wolffian schools and included a comparative procedure that was understood by scientists and pedagogues as a basic faculty of mind. But unlike the Kantians, Ritter follows the Leibniz-Wolffian view and adopts *a priori* idealistic platonic forms as the substratum of experience or what he describes as an "ideale Hintergrund"—ideal background which constitutes the fundamental idea (Grundidee) of his *Erdkunde* (1817, pp. 22-3). This idealistic thinking was common to both classicist aesthetics (Winckelmann, Wolf) and objective idealist philosophy (Eberhard, Fichte, Schelling). Finally, Ritter’s later work reveals a commitment to what Gren might have called a dynamic holism of mutual interacting forces. In addition to mechanical and chemical forces, Ritter’s concept of physical geography includes organic and less quantifiable forces (unberechneten Kräften) (1817, p. 21). He also employs the concept of dynamic equilibrium to explain the physical terrestrial development, and by analogy, human development (1817, pp. 8-9).

Clearly most of the ingredients for Ritter’s geographic science are evident in the intellectual environment of Halle. Even Wolf’s philological criticism was used by Ritter to extract geographic facts of lasting value from the works of classical antiquity (1817, pp. 27-8). In this period when many sciences received their modern logical foundations, Ritter’s logical foundation for geography is not unusual, but the precise form it took and the logical system he chose to apply is a product of his own unique experience, particularly his years as a pedagogue in Frankfurt when he met not only the most eminent pedagogues of the time, but also the most eminent men of science. Ritter’s religious beliefs did not hinder his development, but it certainly guided him toward an idealistic world view. Perhaps the limits of Ritter’s secularity lay in his refusal to follow Goethe and others into the subordination of Christian religious ideals.
to Greek and later pagan ideals. It is perhaps his mistrust of these ideas which prevented his engagement with the intellectual world of Weimar despite opportunities for such contacts.

Ritter left Halle with a sense of incompleteness but with the knowledge that he had achieved much more than he expected:


He was greatly stimulated by the theoretical richness of virtually all the courses he took, with the exception of Sprengel’s Geography and History which were devoid of rigorous logical theory. To Ritter’s mind, the inherent interest of Sprengel’s material overcame in some measure the logical weaknesses of organization. But as Ritter travelled toward Schnepfenthal for the first time in two years, he may have thought about his earliest geographic training in the valleys and forests of the Thüringer Wald. He may have thought too about his first interest in geography and compared it with the dry undisciplined assemblage of facts that he had to record hurriedly and memorize as a student in Halle. As an aspiring pedagogue, Ritter must have realized that Salzmann’s and GutsMuths’ geographic teachings were not a superior kind of knowledge, but rather their method of presentation was more scientific than what he observed in Halle. When Ritter arrived in Schnepfenthal for the first time in two years he described it as the “gelobten Lande”—promised land (Kramer, 1875, p. 55). After some weeks of reflection with GutsMuths, Salzmann and the other members of his Schnepfenthal family, he departed for Frankfurt to begin his formal teaching duties in the Bethmann-Hollweg house.

24“I leave Halle very reluctantly for I owe it much. It has made me into another person, and I leave it better and richer than when I saw it for the first time.”
Carl Ritter, 1800

The next ten years were decisive for the development of Ritter’s ideas. Many powerful factors contributed to his intellectual progress. His practical experience as educator in the Bethmann-Hollweg house deepened his understanding of educational theory and science both through his independent study in preparing lessons, and through practical application of pedagogic and scientific ideas. He also had a series of fortuitous meetings and formed lasting friendships with several eminent pedagogues and scientists who provided great stimulus and direction for his pedagogic and scientific work. The invasion of Napoleon and the growth of German nationalism that found expression in Fichte’s promotion of mass-education were strong motivating forces for Ritter who was moved already by the pietist mission to educate all social classes. These elements gave rise to a unique convergence of ideas extracted from both pedagogic and scientific theory ultimately taking shape in the organizational theory of the Erdkunde, 1817. But the first convergence of these ideas occurred in Frankfurt in 1807 while Ritter was studying the ideas of Heinrich Pestalozzi and in daily contact with Alexander von Humboldt. In retrospect, Frankfurt was not an unexpected place for such a convergence, for the circumstances of the city itself created a frame in which an integration of pedagogy and science was likely to occur. In the first decade of the nineteenth century it had both a large population of professional pedagogues and a large population of scientists, and as a crossroads of Europe, it had a continuous supply of new ideas.

Frankfurt-am-Main: an Enlightened City
At the turn of the nineteenth century, the free city of Frankfurt-am-Main provided unique circumstances for Ritter to pursue his pedagogical and scientific interests.

1"As an educator I live as happily as one can in such circumstances. But one wish remains with me, that I could have more effect, as for example, in a public school."
There were the practical advantages of the city's wealth which were reflected in the enormous wealth of the Bethmann-Hollweg House. Ritter was provided with books, maps, and other materials he deemed necessary for the preparation of his lessons including books for his own studies which he often found at book auctions (Ritter, 1801 in Kramer, 1875, p. 87). Wealth brought certain difficulties for Ritter's Rousseau-inspired teaching, but for Ritter's effectiveness and for his own personal development the privileges of wealth cannot be ignored. Frankfurt's public library held one of the larger collections in Germany with 100,000 volumes by the second decade of the nineteenth century (Blackwoods 5 [1819] p. 101). Frankfurt's academic resources and liberal constitution attracted many foreigners including many scientists, doctors and academics as is evidenced by the membership register of the Wettlerauiische Gesellschaft founded in 1808 (Annalen 1: pp. 2ff). Geographically and commercially, Frankfurt was an important crossroads of Europe, especially for travel between the German cities of Brandenburg-Prussia, Saxony, Paris, and also for north-south travel along the Rhine.

What was peculiar to Frankfurt in October 1798 when Ritter arrived, was the coexistence of an enlightened well-educated aristocracy and a public education system which was so inadequate that it lagged behind the poorer monarchical states of northern Germany (Stricker, ADB 13: 302). Despite official discouragement, private tutorship flourished as the only clear alternative to the notoriously corrupt Quartierschulen system (Voelker, 1932, p. 166). With few exceptions, these schools were operated poorly and for profit by individuals who purchased an hereditary Schulrecht. School conditions and curriculum were subject to inspection by a Consistorium of religious authorities, but this institution embraced a rigid traditional Lutheranism which continued to emphasize strait-laced (engherziger) religious instruction and allowed the deplorable physical condition of the schools and overcrowding to continue through neglect.

Private tutorship reached a high degree of excellence in Frankfurt, but major reforms were launched. Like other Frankfurt tutors, Ritter contributed to both. The excellence which characterized private tutorship was not merely a response to the poor quality of Frankfurt's public schools, for in other parts of Germany private tutors were often accorded the status of domestic servants. But unlike other parts of Germany, the Frankfurt aristocracy was aware of Rousseau's principles of enlightened education.
through popular culture. Rousseau’s *Émile* was an important part of French intellectual culture which exercised considerable influence on Frankfurt. French was spoken on occasion in the Bethmann-Hollweg house. In Spring 1800 this knowledge was stimulated anew by a popular theatrical play which was performed in Frankfurt and which called attention to the problems of private tutors in wealthy homes. It also enumerated the principles of enlightened pedagogy and promoted national education. The play originally entitled *L’heureux malheur* was performed in German as "Die Hoffmeister. Ein Schauspiel in fünf Acten, für Eltern und Erzieher,"—The House Tutor. A Play in Five Acts for Parents and Educators, 1800. The play was a popular success and received a favourable review from a pedagogic perspective in GutsMuths pedagogic journal (J.B. Engelmann, 1800, p. 332).

The currency of enlightened educational views in Frankfurt must be attributed decisively to the efforts of a small group of reformers. In the first years of the nineteenth century, these included W.F.H. Hufnagel, who had great influence as director of the Evangelische Prediger-Ministerium, and F.M. von Günderrode who oversaw the curriculum of the Quartiersschule as director of the Evangelisch-Lutherisch Konsistorium and was responsible for bringing Hufnagel to Frankfurt to replace the aging Senior Moscher. Hufnagel initiated reform by streamlining the system of administration, by promoting enlightened educational opinion through publication and public sermons, and by encouraging active patronage of wealthy Frankfurt families. His most influential publication was: "Von der Nothwendigkeit guter Erziehungsanstalten,"—On the Necessity of Good Schools, 1804,² and his most important patron was Simon Moritz von Bethmann—the brother of Susanne Elizabeth Bethmann-Hollweg who along with her husband Johann Jacob Bethmann-Hollweg was Carl Ritter’s employer.

**Carl Ritter’s Pedagogic Circle**

The efforts of Frankfurt families to bring talented individuals to Frankfurt to educate their children, and the respect they gave this professional class of educators, resulted in a highly able group of original thinkers. In Ritter’s earliest years these thinkers included Friedrich Hölderin and G.W.F. Hegel who came to Frankfurt through the

²This publication is a summary of ideas originally published in his: *Für Christenthum, Aufklärung und Menschenwohl,*—For Christianity, Enlightenment and Human Well-Being, 1787.
efforts of J.G. Ebel and were tutors for the J.F. Gontard and J.N. Gogel families. Ritter does not mention Hölderlin or Hegel in his early letters and both left Frankfurt soon after Ritter’s arrival—Hölderlin in 1798 and Hegel in 1800 (Voelker, 1932, p. 169).

Ritter associated with a group of tutors who were closely allied with Hufnagel. The group usually met around noon by the city gate and in the evenings before dinner at each others’ homes where they allowed their students to play together, and if, as Ritter wrote, "...der Lärm nicht zu groß ist, [können wir] ein vernünftiges Wort zusammen sprechen"—the noise is not too great, we can have an intelligent word with one another (Ritter to Parents, 1798 in Kramer, pp. 63-4). Many practical pedagogic problems and projects were discussed by this informal group which Ritter described as an "...ansehnliches pädagogisches Collegium"—reputable pedagogic faculty (Ritter to Parents, 1798; Kramer, p. 65). Ritter identifies and describes several of his colleagues—Berkelmann, Crecelius, Stein, Hofmann and of more importance J.B. Engelmann, Elias Mieg and F.W. Klitscher (Ibid., pp. 64-5). Hofmann was the most senior of the group and his early death was a great loss for Ritter. Engelmann and Mieg became good friends and played a role in Ritter’s association with Pestalozzi. Engelmann edited the Neuer Kinderfreund, 1802-1806, in which Ritter published works for children. Engelmann also published works promoting the use of music and singing in education as well as several travel guides for Germany. Mieg taught in the home of J.J. Willemer who was an important proponent of public education and supporter of Pestalozzi. Under Mieg’s influence, several well-known Frankfurt families entrusted their sons to Pestalozzi for instruction (Voelker, 1932, p. 170). Klitscher, who studied under Nösselt in Halle, taught earlier in the Hollweg house, was a protégé of Hufnagel and played an important role in Hufnagel’s attempt to found an experimental school in Frankfurt. If any one ideology bound this group together, it was Rousseau’s principles of natural education, and through Hufnagel’s efforts, they developed an enthusiasm for Pestalozzi’s system.

Wilhelm Friedrich Hufnagel (1754-1830): Reform and the Mustershule
Hufnagel was a rationalist theologian. His earliest contributions to the Erlangische Zeitung and his Für Christenthum, Aufklärung und Menschenwohl, 1787, exhibit not only a disposition for liberal systematic theology, but also a strong political component which argues the need for better schools (Stricker, 1851, pp. 28-30; and ADB 13: 301-
3). The fundamental principles of Hufnagel’s education are very practical. Teachers should be prepared to speak to the hearts of children. Educational buildings should be healthy and comfortable, and textbooks like teaching should be graded from the easy to the difficult, and should work toward a well-rounded association of head and heart (Hufnagel, 1804 as summarized in Strieker, 1851, pp. 30-1). The "head and heart" terminology is not merely rhetoric, but an adoption of Pestalozzi’s terminology.

Pestalozzianism is expressed also in Hufnagel’s promotion of zweckmäßig—functional education and his emphasis on physical exercise to produce an harmoniously balanced education (Ibid., pp. 33-4). Nature provided the necessary means of education and geography, natural history and field trips were all considered essential to instruction, as was drawing. But above all, for Hufnagel:

Alles sollte daher möglichst anschaulich gemacht, von allen Seiten betrachtet und immer von der zunächst aufgefaßt werden, die dem Kind die faßlichste und darum die nützlichste ist (Hufnagel as quoted in Strieker, 1851, p. 32).³

Like Pestalozzi argued in his Wie Gertrud ihre Kinder lehrt—How Gertrud Teaches Her Children, 1801, the role of human cognition (Anschauung) as a fundamental principle of pedagogy was recognized by Hufnagel and implemented by founding a model public school in Frankfurt. The Musterschule—model school, was founded in 1804 and was designed specifically after the Pestalozzi Burgdorf Institute as described in Pestalozzi’s Briefe aus Burgdorf über Pestalozzi’s Methode und Anstalt,—Letters from Burgdorf Concerning Pestalozzi’s Method and Institute, which was published by Grüner in Frankfurt in 1804 (Strieker, 1851, p. 31). The school was financed in part by Hufnagel himself and in part by an "ökonomische Deputation"—economic committee, chaired by von Günderrode and Simon von Bethmann. Ritter’s friend Klitscher was appointed as the school’s first teacher (Ibid., p. 34).

In his earliest years in Frankfurt, Ritter was influenced significantly by Hufnagel and shared his enthusiasm for the reform of public education. From Hufnagel, Ritter had an insider’s view of all educational developments in Frankfurt. Ritter attended

³"Everything should be made as perceptive/vivid as possible, considered from all sides, and should always be conceived from that which is the most easily understood and hence most useful to the child."
Hufnagel's sermons, became a close friend, and was taken into Hufnagel's confidence. At the end of 1801, Ritter writes:


This was an enduring relationship, which survived Hufnagel's nervous collapse and slow recovery. In 1810 Ritter wrote that he was treated as a son in Hufnagel's home (Ritter, 1810 in ibid., p. 136).

Hufnagel influenced Ritter's early thinking in several important ways. In addition to Pestalozzi's principles of instruction, his interest in public education and reform may explain Ritter's repeated desire to have a wider effect in his pedagogic efforts that were restricted to a few privileged children in the Bethmann-Hollweg house. For example, Ritter writes in December 1800:

"Ich lebe als Erzieher so glücklich, als man in solchen Verhältnissen leben kann. Ein Wunsch bleibt mir nur übrig, der, daß ich mehr wirken könne, wie z.B. an einer öffentlichen Schule (Ritter 1800; Kramer, p. 79)."

Or later in May 1804 on the occasion of a job offer to act as private tutor to the hereditary prince in Meinungen, Ritter writes "Welchen Einfluß könnte ich da auf die Erziehung eines ganzen Landes erhalten..."--what an influence I could have on the education of an entire country (Ritter 1804; Kramer, p. 90). Likewise in 1806 after Napoleon began his subjugation of Germany, Ritter writes that he feels lucky to live in the relative safety of Frankfurt, but feels restrained.

"Nur zuweilen ergreift mich eine ganz unnennbare Sehnsucht nach einem größeren Wirkungskreise. Es ist mir wie einem Gefangenen, der seine Kräfte zu einem"

"Hufnagel's goodwill toward me continues and my affection for him increases. He is overloaded with work and unpleasant circumstances. He likes to talk about himself and I flatter myself with his trust, for he pours his heart out to me."

"As an educator, I live as happily as one can in such circumstances. But one wish remains with me, and that is, that I could have more effect, as for example in a public school."
Later Ritter shared with Mieg an interest in founding their own educational institute (Ritter, 1808 in Kramer, 1875, p. 120). Hufnagel’s planning of the Musterschule may have stimulated Ritter’s first enthusiasm for Pestalozzi. This was augmented by the enthusiasm of his other colleagues, Klitscher, Engelmann and Mieg—of whom the latter two, like Ritter, spent considerable time with Pestalozzi after his establishment of an institute in Yverdon in 1806. J.G. Ebel must also be mentioned as an important figure in the Pestalozzi movement in Frankfurt. He was a personal friend of Pestalozzi and supported Hufnagel’s reform plans. Through these men, Ritter’s introduction to Pestalozzi’s thinking was linked in this concrete way to the reform of public education in Frankfurt and to his own longing for a larger field of pedagogic effectiveness.

Ritter’s Earliest Knowledge of Pestalozzi

Hufnagel and Ritter’s pedagogic circle almost certainly read and discussed Pestalozzi’s *Wie Gertrud ihre Kinder lehrt* soon after its publication in 1801. Like Hufnagel, Ritter recognized the central role which cognition (Anschauung) played in Pestalozzi’s system. Ritter probably also read a critical review which appeared in GutsMuths’ pedagogic journal in 1802 which focussed attention on this theme and argued that it was not a new idea. The critic St.G. asserts that when Pestalozzi writes that he has discovered that "...alle Realkenntnisse des Menschen von Anschauungen ausgehen..."—all real human knowledge begins with cognitions, or that cognition (Anschauung) is the "...Fundament aller Erkenntnisse..."—basis of all knowledge, he is only restating what has been uttered a thousand times since the work of Basedow (St.G., 1802, pp. 55-7). Ritter would have noted GutsMuths’ observation that pedagogues have only generally conceptualized the cognitive faculty of man, whereas Pestalozzi addresses specifically the mechanical laws of the sensual operation. For GutsMuths this was a "...stark und neu Abweichung"—a strong new departure (Ibid., p. 62).

Pestalozzi sought to order the phenomena of nature in a logical sequence to facilitate and expedite the development of the cognitive faculties. He does not rely

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6"Every now and then a quite inexpressible longing for a larger sphere of action takes hold of me. I feel like a prisoner whose feels his abilities roused by the call to a wider march, but who is restricted to only a few steps."
solely on nature where the occurrence of phenomena is related to the peculiarities of circumstance, for this may lead to confused mental images or ideas. Instead, Pestalozzi wished to control tightly the order in which students are exposed to the natural objects which comprise the essence of instruction, or as GutsMuths summarizes:

...man muß die Objecte, welche dem sinnlichen Menschen zur Anschauung vorgeführt werden sollen, nicht in chaotischer Unordnung vorführen, wie es die Natur thut, sondern nach mathematisch berechneter Ordnung und Form (GutsMuths, 1802, p. 62).7

Pestalozzi achieves this in his celebrated number, form and word system which was based on interconnected instructional exercises of gradually increasing structural complexity. This was the central theme promoted by Hufnagel and was fundamental to Ritter's thinking and found expression in his article on drawing instruction which was published in 1802. It was fundamental to all his later work that argued that one must proceed from the simple to the complex. Ritter's familiarity with Pestalozzi's ideas was fairly comprehensive long before his first visit to Pestalozzi in Yverdon in 1807, but he was not fully aware of the idealistic philosophy that supported it. It had not yet been fully developed by Pestalozzi himself and Ritter still considered his grounding in educational philosophy to be weak (Ritter, 1799 in Kramer, 1875, p. 67). Ritter began to think critically about pedagogy and the process of human cognition (Anschauung) and developed a firm commitment to synthetic procedures. In this period Ritter continued to evaluate critically pedagogic treatises by tracing their philosophical roots—a process he began in the last semester in Halle in 1798 (Ibid., p. 67) and his theoretical knowledge of Pestalozzi's thinking was well-developed by 1806 when he cites him in his own pedagogic article (Ritter, 1806a, p. 216).

**Carl Ritter's Pedagogic Practice and Ideas**

Despite Ritter's early familiarity with Pestalozzi, there is no evidence to suggest that he employed the Pestalozzi method in his pedagogic practice in the Bethmann-Hollweg house. Ritter's method of instruction was modelled primarily after Schnepfenthal and in accordance with the ideologies of Rousseau and Salzmann (Kramer, 1875, p. 69). Nature was the primary source of material for elementary education and like Rousseau,

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7"...one must present the objects which are to be presented to the sensual human for cognition, not in a chaotic disorder as nature does, but according to mathematically calculated order and form."

105
childhood was understood as the *stage of nature*. He uses this expression to describe his youngest and favorite student August Bethmann-Hollweg: "...er ist noch ganz Natur..."—he is still completely natural (Ritter to parents, 1799 in Kramer, 1875, p. 65).

But Ritter’s circumstances in Frankfurt were quite different from those of the Thüringer Wald. Like Rousseau and Salzmann, Ritter worried about the corrupting influences of materialistic society and continually sought to isolate his students. This was reflected in Ritter’s continuous struggle in the extremely wealthy social community of the Bethmann-Hollwegs (Ritter in Kramer, 1875, pp. 59, 87, 88, 92, 97, 99, et al.). Ritter writes in 1804:

> Ich bin nun schon über fünf Jahre hier und habe mancherlei erfahren müssen, von der ich mir sonst nichts träumen ließ. Vorzüglich gehören dahin die außerordentlichen Schwierigkeiten, die mit der Privaterziehung in dem Hause eines Millionärs, in einer Kauf- und Handelstadt unzertrennlich verbunden sind (Ritter to Zerrenner, May 1804; Kramer, 1875, p. 87). 8

He also laments in 1804, that despite the excellent development of his students' knowledge and talents, unfortunately their bodies, hearts, usefulness for life and moral senses are not harmoniously balanced (Ibid., p. 88). Like GutsMuths, Ritter sought to integrate nature study and physical training as a means to develop harmoniously his students’ knowledge and sensual abilities. He arranged field trips and vigorous hikes through the forest and hills around Frankfurt, but there is no mention of a *Turnplatz* in the Bethmann-Hollweg garden.

The natural method of instruction is evident in the order in which he presented subjects to his students. When Ritter began teaching in 1798, his students were quite young—the youngest was five years old. His teaching began with natural history, arithmetic and drawing which were complemented by daily walks or hikes about Frankfurt (see Figure 5.1; Kramer, 1875, p. 63). Ritter then supplemented these subjects with systematic teaching in the elementary sciences. Botany was especially important and Ritter looked forward to the summers when the Hollweg’s retreated to a villa in the outskirts of the city. It is true that Ritter began French instruction in 1799, followed by German in 1801, but the overall emphasis remained nature-oriented.

8"I have been here now over five years already, and have had to experience quite a few things (mancherlei), that otherwise I would have never dreamed of. In particular, this includes the extraordinary difficulties which are inextricably connected with private education in the house of a millionaire in a city of business and commerce."
Figure 5-1
Ritter's Daily Schedule, c.1800

<table>
<thead>
<tr>
<th>Time</th>
<th>Duties and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00a - 9:00</td>
<td>Supervise students' washing and dressing. Breakfast.</td>
</tr>
<tr>
<td>9:00a - 10:00</td>
<td>Children's recreation.</td>
</tr>
<tr>
<td>10:00a - noon</td>
<td>Instruction.</td>
</tr>
<tr>
<td>noon - 1:00p</td>
<td>Town gate, meet colleagues, children play.</td>
</tr>
<tr>
<td>1:00p - 2:00p</td>
<td>Lunch.</td>
</tr>
<tr>
<td>2:00p - dark</td>
<td>Hiking (good weather); reading and drawing (bad weather).</td>
</tr>
<tr>
<td>6:00p - 8:00p</td>
<td>Meets with colleagues and students.</td>
</tr>
<tr>
<td>8:00p - 9:00p</td>
<td>Dinner.</td>
</tr>
<tr>
<td>9:00p - 11:00p</td>
<td>Personal study.</td>
</tr>
</tbody>
</table>

Kramer, 1875, pp. 63-4.
It was not until 1802, that Ritter began instruction in history and the finer sciences--
classics, moral philosophy, religion\(^9\) and aesthetics and it is noteworthy that geography
was not included among this latter group.

Ritter's geographic instruction did not break the mould of eighteenth-century practice.
It was an auxiliary subject which emphasized facts and statistics. This was the model
Ritter followed in *Europa*, 1804, which was a direct outgrowth of his instruction and
which included a citation of Sprengel's *Grundriss der Staatenkunde*, 1793. But in
1799, Ritter mentions also his teaching of *anschauliche Geographie*--cognitive
geography\(^11\) (Ritter, 1799 in Kramer, 1875, p. 69). This was linked to natural
historical observation and Ritter emphasised botany in accordance with his own interest
and experience. He gained as much from field instruction as his students or as he
writes:

> Mit der größten Naivetät kommen sie dann und fragen, wie diese oder jene
Blume heißt, und freuen sich darüber, und ich bin mit ihnen ganz Kind, wenn
ich beim Anschauen in der unendlichen Weisheit und Schönheit, mit der das
kleinste Fädchen gebaut ist, mich verliere und stumm zur Beobachtung eines
andern Blättchens übergehe (Ritter, June 1799 in Kramer, 1875, p. 70).\(^12\)

9Ritter also adopted Salzmann's practice which postponed all religious instruction until
the students twelfth birthday, arguing that it was only at that level of maturity that
religious instruction could have any true meaning (Kramer, 1875, p.83).

10"I have finally completed this week, thank God, the second very complete and final
course in the geography of Europe, and am now beginning history with my students with
the greatest happiness....Every time when I have, so to speak, shaken off such a science,
I have a small celebration and am happy about the time, which I have now won for
worthier subjects."

11*Anschaulich* in this instance is used in the sense of the immediate experience of an
object.

12"With the greatest naivety, (the children) come and ask what this or that flower is
called and are very pleased, and with them I am entirely as a child when I lose myself
in the sensation (Anschauen) of the infinite wisdom and beauty with which the smallest
filament is built and speechlessly move on to the observation of another small leaf."
The pedagogical role of Anschauung in Ritter's early thinking is reflected also in his description of the well-known pedagogue and polymath Horstig and his wife, with whom he hiked for several days through the Harz and in whom he recognized an ideal of educational development, Ritter writes:

Zu ihrer Kunst gehört der hohe Grad der Ausbildung ihrer Sinne mit den Empfindungen, welche so vollständige Anschauungen wie die ihren hervorbringen können, unter der Bedingung des Geschmacks (Ritter, 1800; Kramer, p. 77).13

Their cognitive ability is so developed that Ritter detects what he describes as an "ästhetisch Gefühl"—an aesthetic feel, which he treats as if it constitutes an actual additional physical sense, perhaps one of the latent forces (Kräfte) which GutsMuths hoped to develop (Ibid., p. 77). Ritter recognizes in the Horstigs an ideal harmonious balance, where a high level of cultural refinement has been achieved within an individual who has remained true to nature—a balance which in 1804 he felt was missing in his students (Ibid., p. 77).

**Karl Gottlieb Horstig (1763-1835): Pedagogy and Aesthetic Holism**

When Ritter met Horstig in September 1800, Horstig was a clergyman and superintendent for education in Bückeburg, a position very similar to that of Ritter's stepfather Zerrenner in Derenburg. Horstig was trained in theology at Leipzig but as a writer he produced articles on aesthetics, pedagogy, music, religion and stenography. Horstig is remembered as the father of German stenography by virtue of his book *Erleichterte deutsche Stenographie,*—Simplified German Stenography, 1797. For Ritter, Horstig was a source of aesthetic and pedagogical ideas. He was an accomplished musician and Ritter accompanied him to Halberstadt where the well-known organist Müller played the cathedral organ for them (Horstig, 1805, p. 101; Kramer, p. 78). He was also a well-respected pedagogic writer and Ritter accompanied him and Zerrenner to Blankenburg where they met Regierungsrath von Hille and toured his well-ordered

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13 "To their culture belongs the highest degree of sensual development and sensitivity that such consummate perception can bring forth under the condition of taste."
industrial school (Horstig, 1805, p. 99). Horstig also shared with Ritter an intense interest in landscape drawing and an appreciation for the beauty and sublimity of nature. They travelled together in the Harz in search of landscapes to draw and visited the Teufelsmauer and Regenstein as well as other well-known features. Horstig assembled a portfolio of images from this trip which he published as Tageblätter unserer Reise in und um den Harz—Diary of our Trip in and around the Harz, 1805.

For Horstig, these mutual areas of interest with Ritter all rested on the same intellectual base—an holistic aesthetic system which embraced the idealism of classical aesthetics and the empiricism of eighteenth-century sensualism.

Horstig’s thinking is portrayed aptly in his article "Ueber die Natur und das Wesen schöner Empfindungen,"—Concerning Nature and the Essence of Fine Sensations, 1792-5. He adopts a surprisingly mechanistic view of man, reminiscent of La Mettrie’s *L’homme machine*. Horstig argues that the process of experiencing the "Schöne"—beautiful, is not intellectual, but strictly physiological. The "Schöne" can be generated intellectually, but was reducible to cause and effect physiological sensation. It consists merely of pleasant nerve vibrations (Nervenerschütterung) (Ibid., p. 10). This mechanistic explanation of aesthetic experience also gave rise to a deterministic explanation of variations in taste among mankind. Horstig argues that if physiological science were further advanced, then the minute differentiation in the structure of human neurological fibres which comprise our receptive capacities would be revealed, and the effects of variations in climate, diet, mode of life, etc. would be directly observable (Horstig, 1793, p. 210). Essentially he argues an environmentally determined theory of taste.

As a pedagogue this mechanistic view accompanied a commitment to physical exercise as a means of training the senses. In Horstig’s article "Uebungen und Beschäftigungen für Kinder,"—Exercises and Activities for Children, 1800, Horstig argues that keeping children productively active is essential to their proper development, and that exercises which sharpen the senses are the means whereby this is achieved. He cites GutsMuths’ *Gymnastik für die Jugend*, 1793 (Horstig, 1800, p. 427). In all sensual exercises (visual, auditory, tasting, etc.), Horstig emphasises the role of comparison, differentiation and ordering (Ibid., pp. 324-5, 327, 421, 426). Horstig was a sensualist par excellence. Exercises should be ordered in a sequence of gradually increasing complexity. For example, visual exercises proceed from visual.
measurement of linear quantities, to planar surfaces, and finally to three-dimensional solids. These exercises form the foundation for drawing which should proceed from pure geometric figures to application to the relatively irregular objects of nature such as flowers, leaves, etc. (Ibid., pp. 327-8). Ritter was sympathetic to this view, for drawing was essential to Ritter’s system by virtue of the role it played in developing the faculty of observation—a point Ritter elaborates in his first publication in 1802 (Ritter, 1802, p. 193).

Horstig shared Ritter’s interest in natural history and botany. In Horstig’s view, nature observes regular cause and effect laws—particularly the laws of symmetry; and like the German classical aestheticians, natural phenomena were modelled in accordance with ideal forms, or an original model (Originalmuster) (Horstig, 1795, pp. 23, 26). But Horstig also notes that only traces of regularity and symmetry can be found in nature.

Von der einfachsten Krystallisation ihrer Elementartheile, bis zur künstlichsten Organisation der Pflanzen und Thiere, finden wir Spuren von Regelmäßigkeit, die uns zur Bewunderung reizen (Horstig, 1795, pp. 23-4).14

He argues that all actual occurrences of phenomena are not, and cannot be, regular and symmetric, otherwise the principles of the inexhaustibility of forms (Gestalten) and immeasurability of the creation/evolution (Hervorbringung) would be forsaken (Horstig, 1795, p. 25). Horstig elaborates by noting that:

Jeder Baum, jede Pflanze, jedes Insekt, das wir erblicken, kann nicht regelmäßiger seyn, als es die Natur geschaffen hat, oder es müßte aufhören das Wesen zu seyn, was es in der Reihe der Dinge seyn soll (Horstig, 1795, p. 25).15

Recognition of the irregularity of phenomenal nature is the element which motivated the promotion of Anschauung as a means of discerning nature’s ideal or essential

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14 "From the simplest crystallization of [nature’s] elementary parts, up to the artistic organization of plants and animals, we find traces of regularity which rouse our admiration."

15 "Each tree, each plant, each insect which we behold, cannot be more regular than nature created it, or it would cease to be that object which it should be within the series of things."
forms. This was to be achieved by the comparison of many occurrences of a particular natural object and abstraction of commonalities so as to derive its essence—a synthetic operation which might be described as a process of iterative refinement of a general form.

Like the existence of ideal forms in nature, Horstig also suggests that "Schönheit"—beauty, is only an ideal. He adopts the principle of continuity in his discussion of music and argues that Schönheit is derived by the purity of tone, and that there is no tone which cannot be purer (Horstig, 1793, pp. 205, 216-18). Therefore complete Schönheit can be approached but never attained. If simple physical sensations have as many grades of Schönheit as there are grades of purity, then how many more levels of Schönheit are possibly generated by combined sensations (Ibid., pp. 207-8). Horstig argues that artists should employ this principle of aesthetics to create purer art.

Which of these thoughts were discussed by Ritter and Horstig, during several days in the Harz, is not certain. But Horstig's thinking about pedagogy, drawing and music, are embraced by a single aesthetic system. It was grounded in an aesthetic idealism which Ritter would have recognized from his study under Eberhard and Wolf in Halle. It also incorporated the principle of continuity in nature which was a subject of discussion between Blumenbach and Ritter in Göttingen a few days prior to Ritter's visit with Horstig (Ritter, 1800 in Kramer, 1875, p. 75). Ritter and Horstig shared also an interest in natural history and botany which suggests that if Ritter ventured to discuss nature with Horstig, taxonomy may have been a subject of conversation. The role of drawing in education was a likely theme for they were both drawing enthusiasts and spent considerable time together in the Harz while Horstig prepared his portfolio of images. But the actual subjects of discussion, whether it be music, art, pedagogy, drawing or nature, mattered less than the basic aesthetic perspective from which all else arose. It was this all-embracing aesthetic system which Ritter admired in Horstig.

"Etwas über den Unterricht im Zeichnen,"--A Note Concerning Instruction in Drawing, 1802

Carl Ritter's first published article appeared in GutsMuths journal in 1802, and was written to elaborate an article by Horstig which appeared in the journal a few months earlier. Ritter discusses primarily his own ideas about drawing instruction, but he reveals also his own aesthetic thinking, his pedagogy, and the links between them.
Like Horstig, these views are closely related, for the attainment of a "hohe ästhetisch Gefühl"—a high aesthetic sense, was closely related to moral development, which was an ultimate aim of pietist education. For Ritter an equally important aim, was the preparation of what Rousseau described as "useful" members of society. If a true artist with a highly developed aesthetic sense could not be developed, then surely a useful member of society was a worthy by-product of education (Ritter, 1802, pp. 200, 201). The means whereby either aim was achieved were precisely the same—through systematic, hierarchical, nature-based instruction, and like Horstig, Ritter’s pedagogy included drawing as an essential component of what Ritter called "zweckmäßig" instruction (Ritter, 1802, p. 193).

Ritter differed from Horstig in at least one important way. Ritter employs a less mechanistic concept of man. In Ritter’s aesthetic thinking, beauty (Schönheit) is an intellectual process, instead of mere mechanical sensual receptivity. Ritter defines the beautiful as a unity or a dialectical synthesis between sensing and intellection or judgement. A work of art which is not sufficiently subordinated to the laws of reason, is irrational or incoherent, but a work of art which is overly subordinated to reason, is merely intellect, with insufficient content (Ritter, 1802, p. 196). This balanced restraint was characteristic of the aesthetic ideal of German classicism—a movement which remained at odds with the irrationalist elements of early German romanticism. This balance formed a basis for the experience of nature. Nature is not merely sensed, but also contemplated according to the laws of reason. The underlying order of nature, its inherent Zweckmäßigheit, is the rule which proper art should not transgress (Ritter, 1802, p. 196). The educated "aesthetic sense," which Ritter recognized in Horstig, constituted an aim of education, including the ability rationally to appreciate or reflect upon this order. Holistic thinking was an exercise in appreciation of the intricate order of functional interconnection of all the parts which together comprised nature’s totality.

Ritter’s method of drawing instruction was consistent with Horstig’s thinking. It advocated a system which was ordered hierarchically and examined natural phenomena in accordance with increasing structural complexity. For Ritter, this thinking may have been derived from Hufnagel and Pestalozzi. To begin with human anatomy as a

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16The adjective "zweckmäßig" might best be transliterated as "aim-measured" or "in conformance with an end." In general use, the meaning lies somewhere between the words: appropriate, suitable and functional.
subject of drawing was according to Ritter wrongly conceived by virtue of the limited cognitive and intellectual powers of children (Ritter, 1802, pp. 207-8). Only after the laws of geometric relation were understood and systematically applied to less complex forms, could students hope to observe correctly a body of such consummate complexity. Ritter notes that all objects are, in a mathematical sense, combinations of simpler parts. Therefore he suggests that:

Der sicherste und einzige Weg, zur deutlichen Vorstellung von ihnen zu gelangen, ist—vom Einfachen zum Zusammengesetzten, von den Theilen zum Ganzen überzugehen (Ritter, 1802, p. 194).17

This principle is fundamental to all of Ritter’s later work including the *Erdkunde* where it is described as a Grundregel—fundamental rule (Ritter, 1817, p. 24). Ritter proceeds synthetically by introducing the student to mathematical figures in ascending order of complexity, from lines to planar surfaces, from planar surfaces to three-dimensional figures. Following Horstig, he argues that such training should be accompanied with corresponding application of such mathematical forms to nature, or as he writes:

Nothwendig wäre es, von den einfachsten Linien auszugehen, und in einer natürlichen Reihe, stufenweise, bis zu den zusammengesetztesten Figuren fortzuschreiten, und immer diese Regeln mit der Anwendung in der Natur zu begleiten (Ritter, 1802, pp. 197-8).18

For example, planar forms, such as triangles, squares, etc., can be observed in the structures of buildings, or in the forms of rocks, or in the beak of a bird. Complex curvilinear planar surfaces have excellent application in the plant world (Ritter, 1802, p. 198). Together, this progression from simple mathematical figures to complex figures, and the concomitant observation of similar forms in nature constitutes merely the first level of instruction. What might be called, the elementary level.

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17"The surest and only way to attain a distinct idea of these [objects], is to proceed from the simple to the complex, from the parts to the whole."

18"It would be necessary, to begin with the simplest line and advance, stepwise, in a natural series up to the most complex (Zusammengesetzten) figures, and always to accompany these rules (i.e. mathematical rules) with application in nature." Zusammengesetzt may be transliterated as set together.
The second level of drawing instruction, is what Ritter calls the *zweckmäßig* level, where students explore the functionality of forms, or the functionality of the parts of wholes. Forms are only comprehensible in terms of the ends to which they are put. Ritter begins with simple objects such as tools, instruments, furniture, wagons, buildings, etc., the main object being, to detect necessity in the form of their construction. He extends this exercise to plants and animals emphasising the functional utility of their internal parts.

Hier müßte man erst das zeigen, was allen Dingen gemein seyn muß, ehe man an die bestimmten individuellen Zwecke vorschritt. z.B. alle Mittel zeigen, wodurch man das Feststehen der Dinge bewirkt; die Dauer, das Verhältniß der Theile zum Ganzen, in Hinsicht auf Zahl, Größe und Verbindung (Ritter, 1802, p. 199).19

Ritter then introduces a geographic component into his thinking. He argues that the *Zweckmäßigkeit* of parts in machines, furniture, clothes, houses, etc., can be observed, and their variation among different national groupings can be indicated (Ritter, 1802, p. 199). He does not elaborate. After these preparatory exercises, Ritter applies this thinking to nature in an ascending order of structural complexity culminating in mankind, nature’s most consummate creation:


Ritter then generalizes this method of drawing instruction into a broader principle of pedagogy based on Rousseau. Children are taught about society by the application of this same *Zweckmäßigkeit*. They are assigned chores, taught to use tools, and required to perform useful work, in short, they are assigned a functional role. For in work is found the essence of social function and social relation. *Zweckmäßigkeit* is therefore

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19"Here one must first show what all things must have in common, before one advances to specific individual purposes. For example, to show all means, whereby one brings about the fixity (Feststehen) of things, the duration, the relation of the parts to the whole with respect to number, size and interconnection."

20"Finally, the laws of functionality in living organic nature would follow, touch somewhat on the physiology of plants, proceed to the anatomy of animals, and close with the anatomy of man."

115
both an aesthetic principle which invokes the rational component of aesthetic experience, as well as a practical pedagogic device which achieves moral development by the practical understanding of social relations. Ritter produces an image of the world which is part and parcel of a transcendent aesthetic system. The concept of "artist" as the aim of education lies in a much expanded concept of art and it becomes a somewhat exceptional state to reach, perhaps only accessible to the "Genie"--genius. If such an ideal is not actually achieved, then at least morally fit and socially useful citizens are produced, or as Ritter writes:

Dieser Abschnitt arbeitet recht eigentlich für das thätige Leben, und mit ihm könnte sich der begnügen, welcher kein Talent zur Kunst in sich fühlt; ihn sollten aber alle Menschen durchmachen, die der menschlichen Gesellschaft in mechanischer Hinsicht nützlich werden wollen (Ritter, 1802, p. 200).21

This second Zweckmäßig level of instruction gives rise to a third stage, the synthesis of beauty, or the binding together of the plenitude to unity (Ritter, 1802, p. 200). Ritter is not specific about how this third stage of instruction actually operates, or how this binding process is further stimulated. He does suggest that this course never really ends and suggests that nature alone can provide the most beautiful forms for contemplation.

Die schönsten Formen schuf die Natur, weil sie allein ihrem Wesen nur Leben geben kann, und dieses Leben mit schöpferischer Hand selbst der Form einprägte, in der uns die Materie erscheint (Ritter, 1802, p. 201).22

Life manifests itself in three ways, through plants, through animals, and through mankind; and only those who are born artists, can comprehend the highest, i.e. mankind itself.

21"This section [of instruction] works quite well for the active life, and therein it could be satisfying for one who feels no talent for art, all men who wish to be useful to human society in a mechanical respect, should however, work through the exercises of this instruction."

22"Nature creates the most beautiful forms because it alone can give life to the essence of forms, and this life was impressed by the creative hand itself into those forms in which material appears to us."
Despite the highly suggestive remarks concerning the observation of Zweckmäßigkeit in the artefacts of regional human groups, and his remarks about its application in understanding social order, Ritter neither extends or elaborates this reasoning to analyse functional relationships within or among regional units themselves. Nor does he seek to explain why regional variations arise. Instead he restricts himself to drawing instruction. In this same period, Ritter began to produce the text for his Europa, 1804, which contains additional insights and development of these themes. In this period also, Ritter forged a close relationship with J.G. Ebel whose regional studies of the cantons of Switzerland, and his use of environmental causation were an important influence which actively stimulated and moulded his work.

Johann Gottfried Ebel (1764-1830): Geography and Environmental Determinism
It is hard to specify which element of Ebel’s practical and intellectual influence was most important for Ritter. Their personal relationship spanned many years and involved not only a continuous exchange of ideas, but also the planning of trips and meetings with other men of letters. In 1807, Ebel helped Ritter plan his trip to Switzerland, and wrote Ritter several letters of introduction including one to Pestalozzi. Ebel was an important force in the Pestalozzi movement in Frankfurt and shared and stimulated Ritter’s interest in educational reform (Schmitthenner, 1951, pp. 17-19). Like Pestalozzi, Ebel’s interest was linked ultimately to political reform. Ebel’s notoriety in Europe was linked to French revolutionary thinking, rather than science. He translated Abbé Siéyé’s works into German and his correspondence from Paris in 1796-7 to influential Swiss citizens warning of French plots against Swiss independence, undertaken at great personal danger, led to the adoption of liberal reforms in Switzerland and to an award of Swiss citizenship (Gümbel, ADB 5: 518).

Despite this notoriety, Ebel’s influence on Ritter in this early period was not so much political as it was pedagogic and geographic. The lasting importance of Ebel to Ritter is revealed by Ritter’s inclusion of Ebel in the dedication of the second volume of the Erdkunde. Ritter also cites him in the introduction to the first volume as an important source of inspiration.
Ritter also cites his geological work, but in Ritter's early period in Frankfurt, Ebel was less a source of geologic ideas, than he was a source of inspiration for Ritter's own developing interest in travel literature, and its method of presentation. Ebel's most obvious influence is expressed in the concept and structure of Ritter's first major work *Europa, ein geographisches-historisch-statistisches Gemälde,*--Europe, a Geographical-Historic-Statistical Picture, 1804. The structure of this work might be understood as a hybrid of two earlier works by Ebel--his Swiss travel guide (1793) and his scientific portrayal of Swiss culture and alpine physiography (1798-1802).

Ebel was a doctor of medicine and received his degree in 1789 for a comparative anatomical study *Observationes neurologicae ex anatome comparata* published in 1791. His formal university studies in Frankfurt-am-Oder were followed by a long stay in Vienna and a three-year sojourn in Switzerland, where he studied the natural history and geognosy of the Alps in great detail. He also observed systematically the habits and customs of the peoples as well as their individual histories and arts. In 1793, he settled in Frankfurt-am-Main where he began a medical practice and a close association with the comparative anatomist S.T. Sömerring. In his free time, he compiled his Swiss notes and produced a highly successful *Anleitung auf die angenehmste und nützlichste Art in der Schweiz zu reisen,*--Guide to the Most Pleasant and Useful Way to Travel in Switzerland, 1793. The work was recognized as a model study, especially by scientific travellers and it generated interest among the educated classes of Europe for travel and careful observation of countries and peoples (Gümbel *ADB* 5: 518). The work went through three editions, each of which was enlarged and updated and became a standard work for the teaching of Switzerland by the Swiss (Ibid., p. 518). In addition to many practical travel tips, the guide included instruction in geography, natural history, statistics, history, government, law and literature, and was appended with an extensive bibliography. It also contained a directory of library collections and educational institutions--e.g. the second edition (1804) describes Pestalozzi and his work in Burgdorf (Ebel, 1804, pt.1). The range of

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23"From its inception, the present work owes what warmth and life it may possess, to several years of association with this nobleman."
topics is illustrated by Ebel's inclusion of both a geologic cross-section of the Alps and a lexical guide to Swiss dialects (Ibid., pp. 223-35). In large part, the second edition which was prepared in Frankfurt while Ritter was working on Europa, comprised a topographic dictionary which lists cities and explains their contemporary and historical significance and includes a geognostic and botanical description of their environs.

In 1798, Ebel produced an academic work entitled Schilderung der Gebirgsvölker der Schweiz,--Portrayal of the Mountain Peoples of Switzerland, 1798-1802. This work was a rewrite of his earlier travel guide which dispenses with the travel information and dictionary format though it retains a regional reference format. The publisher Useri describes the book as an attempt:

...eine genaue und treue Geilmüde ihres physischen, bürgerschen, politischen, moralischen und ökonomischen Zustandes zu liefern (Usteri in Ebel, 1798, foreword).24

The work proceeds regionally and contains a multitude of interesting anecdotes as well as purely scientific observations. This regional format bears an affinity with the organization of Ritter's Europa which Ritter himself described as culminating in an index or register (Ritter, 1804, p. viii).

As a scientist, Ebel is remembered as a geologist who held idiosyncratic ideas about the earth's construction based exclusively on observation and independent from all external theory (Gümbel, ADB 5: 518). The eminent geologist Leopold von Buch once cautioned Ritter not to be too carried away with his ideas (Kramer, 1875, p. 179). But Ritter was sympathetic to Ebel's commitment to empirical study and Ebel's writings promote explicitly the inductive comparative method. He writes for example:

Weder Anhänger irgend eines Systems, noch gemäßleitet im Sehen durch vorgefaßte Meinungen, werde ich treu mittheilen, was meinen Augen am stärksten auffiel, und vergleichende Beobachtung bewährte (Ebel, 1798, p. 369).25

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24"...to furnish a precise and true picture of [Switzerland's] physical (physichen), civic, political, moral and economic situation."

25"I will truly report, neither as a follower of some one system, nor through the misled vision of preconceived opinions, what most strikingly caught my eye and which comparative observation confirms."
Ebel also promoted the scientific and philosophical investigation of environmental influences or the physical qualities of a land to explain variation among regionally defined human groups.


The physiological processes which determine the regional characteristics of human groups are not explained in this portrayal of Switzerland, rather Ebel leaves this to the work of physicists and physiologists despite his own grounding in comparative anatomy.


Certainly Ebel shared with Ritter personally his own suspicions about the mechanico-neurological vehicles of cultural differentiation.

The impact of Ebel’s geologic work on Ritter in this early period is uncertain. In 1801 Ebel had begun the preparation of his *Ueber den Bau der Erde* which was not published until 1808. This geologic work is the outcome of his Swiss studies and was produced as an independent work because of the increasingly unwieldy size of the guide (Ebel, 1805, p. x). The work is of geologic interest, but also adopts a vitalistic

26"No one doubts that climate, air and soil noticeably influence the health of humans. In those characteristics must be sought the deepest causes of the physical appearances of animal bodies....Less recognized is the great influence of the physical situation of an area on the sensory ability and intellect of its inhabitants."

27"I relinquish this [task] to physics and physiology, [i.e.] to present the most determinate proofs from the laws of organic nature, and I deal here only with the most noticeable phenomena which appear to me to be very noteworthy in this consideration of our mountain people."
view of the Earth. Ebel argued that by virtue of its stratigraphic layering, the Earth was a huge voltaic pile from which emanated its electro-magnetic field and was therefore to be considered as a lifeform in its own right (Ebel, 1808, p. 423). Ritter's diction in the *Erdkunde* is similar to Ebel's. Ebel speaks of the "Natur-Hieroglyphen"-hieroglyphics of nature and in his travel guide he suggests that one must first learn the "Buchstaben der Alpennatur"-alphabet of alpine nature--before one can read these hieroglyphics (Ebel, 1805, p. vii; 1808, p. xxx). This terminology finds expression in *Erdkunde*. Ritter refers to the natural phenomena of nature as "Denkmale"-memorials and as "Hieroglyphenschrift"-hieroglyphic writing which must be deciphered (Ritter, 1817, p. 4).

Ritter does not incorporate *actively* the more exotic elements of Ebel's thinking despite Ritter's ponderous reflections about the earth's gravity (Ibid., p. 12). But Ritter directly refers to Ebel's diluvialist thinking when he writes that Ebel:

...führte...durch die Combinationen der mannichfaltigsten Thatsachen, welche die Natur ihm darbot, die Idee der Gleichzeitigkeit in der Schichtenbildung und der Regeneration ihrer Urformation ein (Ritter, 1817, p. 37).28

This theory was followed by J.L. Heim and according to Ritter was confirmed by J.F.L. Hausmann in his studies of northern Europe (Ibid., p. 37). Ritter also acknowledged Ebel's conception of the unity of the highlands of the earth which Alexander von Humboldt investigated and introduced into physical geography (Ibid., p. 37).

Despite Ritter's selective adoption of Ebel's geologic ideas in the *Erdkunde*, Ebel's interest in regional description had a greater influence on Ritter during the period of preparing *Europa*. Ritter's contributions to *Neuer Kinderfreund*, 1803-1807 appear to be inspired also by Ebel. These contributions included "Hormemanns Reise im nördlichen Afrika,"--Homemann's Travels in North Africa, 1803, and later "Neuholland,"--New Holland, 1806. Ebel may have influenced Engelmann himself whose journal sought to provide reading material for children and included numerous travelogues. In 1807, Engelmann published his own travel guide *Taschenbuch für*

28"...introduced...by the combination of the most diverse facts which nature offers, the idea of simultaneity within stratigraphic development and regeneration of its original formation."
Reisende durch Teutschland und die angranzenden Provinzen. Mit einer Postcharte,—Pocketbook for Travellers in Germany and Bordering Provinces, with a Postal Map, 1807, which resembled Ebel’s Swiss guide and provided detailed information about the timings of postal wagons—an important source of transportation at that time. But the most important consequence of Ebel’s influence was its effect on Ritter’s first attempt at a comprehensive geography.

Carl Ritter’s Europa, ein geographisches-historisch-statistisches Gemählde,—Europe, a Geographical-Historical-Statistical Picture, 1804-1807

Ritter’s Europa was a direct outgrowth of his geographic and historical instruction in the Bethmann-Hollweg house. Like many eighteenth-century thinkers, Ritter viewed geographic instruction as an indispensable basis for instruction in history. Ritter’s daily preparation for instruction included his summation of the most important geographical and historical studies concerning European empires. These summaries provided the contents of Europa. As an educator, Ritter recognized the need for such a reference work which could act both as a basis for instruction for teachers, but also as a guide for an educated public with a growing interest in the geography and history of Europe (Ritter, 1804, pp. xiv-xv). Ritter also recognized the need for a condensed compilation of many works which were prohibitively expensive or difficult to find (Ibid., p. vi). But most suggestive is Ritter’s desire to make his geography pragmatic (Ibid., p. vi).

In April 1804, when this preface was written, the term "pragmatic" was an unequivocal reference to Kant who sought to distinguish between the practical knowledge of what man could and should pursue, and mere theoretical knowledge of the physical laws of the world. Like Ritter’s instruction in the finer sciences, Kant’s Anthropologie as a science of mankind was built upon a geographic foundation.

Eine solche Anthropologie, als Weltkenntniß, welche auf die Schule folgen muß, betrachtet, wird eigentlich alsdann noch nicht pragmatisch genannt, wenn sie ein ausgebreitetes Erkenntniß der Sachen in der Welt, z.B. der Thiere, Pflanzen und Mineralien in verschiedenen Ländern und Klimaten, sondern wenn sie Erkenntniß des Menschen als Weltbürgers enthält (Kant, 1798, re., 1907, p. 121).29

29 Such an anthropology considered as world-knowledge which must be pursued after our schooling, is actually not yet to be called pragmatic if it includes merely an extensive knowledge of things in the world, e.g. animals, plants and minerals in different lands and climates, but rather if it includes knowledge of mankind as a citizen of the world.
This was the idealistic concept of science that Ritter adopted as a framework for his *Europa* if not for all his subsequent geographical work. In *Europa*, Ritter writes that the main object of our efforts is an understanding of mankind. As such, mankind is considered:

...zu erst in seinen physicalischen, dann in seinen moralischen und intellectuellen Verhältnissen, und in dem, was auf diese vorzüglich wirkt Religion, Erziehung, Regierung (Ritter, 1804, p. viii).

He also explains that he seeks not to produce a collection of facts for memory, but rather a "Veredlung des Geistes"—an ennobling of the mind (Ibid., p. vi).

The method of Ritter's pragmatic science is cast within a pedagogic framework. The work is not an ideological statement of education theory, or a pedagogic work in a narrow sense, but Ritter's words emphasise a holism which relates closer to a synthetic mental process than to the holistic system of nature. He writes for example that:


But he writes also that the individual objects of nature are not to be considered merely in their own right, but "...immer in Hinsicht auf das Ganze"—always in respect to the whole (Ibid., p. vi). The whole was a generic concept. He seeks to satisfy himself not merely with general remarks about nature and man, that provide material for memorization, but rather to produce a "...Reihe von That sachen und Schilderungen in einer geistigen Verbindung"—series of facts and portrayals in a mental connection (Ibid., p. vi).

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30"...first in his physical, then his moral and intellectual circumstances, and in that which these primarily affect, religion, education and government."

31"My aim was to elevate the reader to a living view of the entire land, its nature and man-made (Kunst) products, its human and natural world, and to present (vorstellen) all of these as an interconnected whole..."
Ritter also acknowledges explicitly the comparative faculty as a means of achieving this mental unity. But he conceptualizes it in a restricted way. Ritter writes that the most important results concerning nature and man are developed from man and nature themselves by means of "gegenseitigen Vergleichungen"—mutual comparisons (Ibid., p. vi). This comparative method is restricted to a comparison between man and the land he occupies, that is within a regional unit. It is not employed as it is later in the *Erdkunde* to compare also the features of different regional units. Ritter’s aim is not the generation of a theoretical model of man-land units, but rather the effective presentation of interconnected facts within single regional units—a distinction which might be characterized by the terms nomothetic and idiographic respectively. Ritter may have been motivated by Ebel’s desire to present information in a form compatible with the needs of general science.

Ritter sought also to present regional units as instances of environmental causation. But like Ebel, he did not investigate the processes or seek to generate a model of environmental influence. The comparative apparatus was restricted to the synthetic presentation of the various products of environment. It is not clear if Ritter was aware of this distinction or whether he consciously restricted his geography and the comparative method to a non-theoretical collection of facts in conformance with traditional geography. But environmental influence was central to his concept and his attempt to use the reciprocal relationship of man and land as a method of presenting geographic facts is what he acknowledges as distinguishing his work from previous geography.

Es schien mir, als wenn man bisher den wichtigen Einfluß der Naturbeschaffenheit in den Geographien, zu leicht und oberflächlich behandelt hätte, und ich machte mir es zum besondern Augenmerk, ihren Einfluß zu zeigen (Ibid., p. vii).32

This environmental determinism is operationalized by Ritter through a concept much akin to Marx’s own historical materialism. Ritter argues that the physical geography of the earth is the frame in which all else takes place:

32"It appeared to me as if hitherto in geographical works one handled too lightly and superficially the important influence of natural condition. I made it my special concern (Augenmerk) to show such influence."
Sie ist das Skelet, um welches alles andre nur Fleisch und Muskel ist; sie gibt dem ganzen Zusammenhang und jedem Theile seinen eigenthümlichen Character und sein Leben (Ibid., p. vii).³³

The physical environment for Ritter is the most important determining element of exchange relations—a nature-technology dialectic where human survival is the propelling force. Those products which are determined by and peculiar to a region, determine the nature of business and trade, which in turn, determines social relations, the structure of the state and the power a state possesses for its own perpetuation and survival (Ibid., p. viii). The fundamental units of analysis for Ritter were social units or folk-groups (Völker) in connection with their physical bases (Länder).

Ritter emphasises the importance of environmental causation, but he does not completely forsake the so-called "heroic" element of man. Each region has an historical component which as he notes must remain inseparable from geography: "Das Land wirkt auf die Bewohner, und die Bewohner auf das Land"—the land affects the occupant, and the occupant, the land (Ibid., p. vi). The historical element is not conceived merely as the human side of a man-land dialectic, but plays a role in defining the current environment in terms of inherited landscapes—a product of socio-historical relationships. The historical introductions which accompany Ritter's analysis of each empire, are calculated so that each:

...ganz kurz zeigt, wie sich nach und nach das Volk und der Staat, unter den jedesmaligen Verhältnissen, entwickelte und bildete (Ibid., p. vii).³⁴

The cultural historical element also provides the key to the understanding of the present relation of the people to the land. It serves to show what a country owes to the people. It incorporates political history only in so far as it has an influence on the development of the state and form of government (Ibid., p. vii). He notes that such cultural history as an academic study has so far been developed only fragmentarily. In

³³"It is the skeleton, around which all else is only flesh and muscle. It gives life and individual character to the entire association (Zusammenhang) and each of its parts."

³⁴"...shows briefly, how the people and the state evolved and developed under the respective circumstances."
his view, this dearth of literature is another reason why his work emphasises the physical environmental element.

The Reception of Europa

Despite a clear statement of method and intent, Ritter's work was not completely successful. He was aware of deficiencies himself, but was unwilling to restate his intended aims. He describes his work as a Gemahlde—picture, to distinguish it from Ebel's Schilderung—portrayal and to convey his intent to produce a greater unity in the presentation of material. He says that such a presumptuous title was consistent with what he hoped to achieve (Ritter, 1804, p. viii). The work received polite and encouraging words, but the accompanying criticisms were direct and well-founded. The Neue Allgemeine Deutsche Bibliothek described the work as written with "...sichtbare[m] Fleiße, mit kritischer Genauigkeit und nach einem guten Plan..."--visible industry, critical precision and in accordance with a good plan (NADB, 1805, p. 219). Likewise the Allgemeine Geographische Ephemeriden observes that:

Die Sprache ist meistens rein, der Vortrag fliessend; die Materialien sind grösstentheils gut gewählt (AGE, 1805, p. 318).\footnote{"The language is mostly clear, the content (Vortrag) industrious, and the materials for the most part are well-chosen."}

But in scientific respects the AGE also asserted that despite the indisputable talent of the author, the work was still deficient (mangelhaft) and that this deficiency was aggravated by the presumptuous tone (anmassende Ton) which is embraced by the title and the proposed aims of the preface (Ibid., p. 314).

The AGE notes that Ritter's desire to represent the human and natural worlds as "...ein zusammenhängendes Ganze"--an interconnected whole, could not be satisfied by the normal procedure of statistics, i.e. the mere provision of facts and numbers, but rather by the combination of these assembled materials (Ibid., p. 315). This deficiency was acknowledged by GutsMuths' review in his pedagogic journal. He describes Ritter as "...weder jenen vollkommen Meister noch den bloßen Kompilator"--neither a consummate master, nor a mere compiler (GutsMuths, 1805, p. 247). But GutsMuths distinguishes the work from eighteenth-century compendium geography when he writes:
From a pedagogical point of view, GutsMuths says that he could think of no better work for the student who has completed a course in geography (Ibid., p. 247). The AGE was not as charitable and characterizes Ritter’s work as superfluous (überflussig) and identifies it as one of many works like those of Aschenwall, Meusel, Normann, Toze, et al. (AGE, 1805, p. 313). The NADB also identified the work as one among the many geographical-statistical works which inundated Germany at that time (NADB, 1805, p. 219). The historical introductions were well-written, but as all the reviewers noted, there were many errors, inaccuracies and gaps. The historical summaries remained as appendages to the geographic summaries despite Ritter’s stated aims.

Despite his discussion of man-land units, Ritter did not break away from the consideration of Europe according to politically defined units. He postponed his consideration of the German lands in the hope that the political situation would stabilize (Ritter, 1804, p. xiv). The second volume of Europa, which was scheduled to appear in 1805, was published in 1807. The third volume never appeared. By 1807, Ritter’s conception of geography had developed considerably. This was presumably at the base of his decision not to pursue publication. On the other hand, after the Napoleonic conquest of Germany in 1806, the preparation of a volume which would have included a current evaluation of Germany, may not have been a task Ritter relished for emotional or practical reasons. The uncertainty of the German situation in this period would have made any traditional spatio-political definition meaningless in terms of traditional eighteenth-century Staatskunde, with which Ritter’s Europa had been included. The most revealing testament of Ritter’s failure to implement adequately his plan is Kramer’s assertion that the importance of Ritter’s methodological notes was nowhere recognized (Kramer, 1875, p. 169).

36."Without becoming a travel-description, it remains distinct from the skeletal compendiums. It furnishes through agreeable lectures, a dense overview of the history and the geographical and statistical situation of the European states."
Sources of Methodological Ideas

The sources which Ritter adopts in his methodological thinking reflect his wide reading. Many of these sources are not acknowledged explicitly in the work itself. By April 1804, when the preface to *Europa* was written, Ritter had met a many individuals in Frankfurt as well as in other cities in *Mittel-deutschland*. In addition to J.G. Ebel, Ritter encountered several natural historians who sought to understand the role of environment in cultural variation. Ritter met Blumenbach in Göttingen in 1800 who employed the same determinism to explain racial differences and who like Ebel also promoted the scientific compilation of travel observations. Likewise, Sömmerring, whom Ritter met in Frankfurt in 1802, was occupied with the role of environment and sought to promote the fusion of physiology and comparative anatomy. But Ritter was also well-read in the historical classics of the time including Herder’s *Ideen*, 1784-91, which promoted the concepts of nationality and environmental causation (Nisbet, 1970, pp. 223-31). He also read A.L. Heeren’s *Ideen über die Politik, den Verkehr und den Handel der vornehmsten Völker der alten Welt*,--Ideas Concerning Politics, Commerce and Trade of the Most Eminent Peoples of the Old World, 1793-1812, which may have been of decisive importance. Heeren’s work integrates environmental causation into historical discourse in a scientifically systematic way by emphasising the role of trade in the progression of history. Ritter cites this work in 1806 (Ritter, 1806a, p. 219). But Ritter’s familiarity with Heeren’s work does not exhaust the possible sources of such thinking, for Herder’s *Ideen* disseminated the basic environmental theme to a wide range of scientists and historians. Ritter’s integration of these ideas into a comparative methodology must be examined in connection with many other thinkers. Only then can his evolution from compendium to systematic geography be understood clearly.
The development of Ritter's knowledge of natural science during this period is hard to separate from his pedagogic thinking, for almost all his ideas were acquired with a view to their application in private teaching. His own independent study in natural history was quite deep, and the themes he pursued were guided by eminent scientists whom he met both in Frankfurt-am-Main and during his travels in Mitteldeutschland. These scientists include the famous comparative anatomists J.F. Blumenbach (Göttingen) and S.T. Sömmering (Frankfurt-am-Main), as well as the geologists J.K. Freiesleben (Sangerhausen) and J.L. Heim (Meiningen). These respected scientists contributed greatly to Ritter's understanding of the application of the comparative method to science and Freiesleben may have been responsible for Ritter's earliest knowledge of Alexander von Humboldt.

Ritter was aware of the logic of the comparative method from his study of Kant under Jakob in Halle, as well as through his familiarity with its application in German pedagogy. But his experience with the method as a scientific tool was limited. This period of travel and study increased Ritter's understanding of the method as applied to the problems of practical science. As an educator, this practical knowledge was absorbed into his own pedagogic understanding of the process of learning. In practical terms this meant an understanding of the comparative method both as a scientific tool and as a fundamental faculty of mind. This integration culminated in an unified conception of science and pedagogy which owed much to Fichte's philosophy of science as adapted by Pestalozzi's pedagogic collaborators in Yverdon. This is the chief significance of his meetings with Pestalozzi in Yverdon in September 1807 and his subsequent meetings with Alexander von Humboldt in Frankfurt-am-Main in October 1807. Von Humboldt confirmed scientifically what Pestalozzi had deduced.

1"Pure science, as synonymous with the contents of knowledge derived from logical principles and not created from experience, is a science that Geography cannot be."
pedagogically. Both meetings were important for the development of Ritter’s general comparative geography, but Ritter’s preceding years of travel and independent study were of equal importance both as a source of practical knowledge of the comparative method in science and also as a source of knowledge about theories of regional variation of biological and geologic phenomena. A trip to Göttingen in September 1800 was of special importance, for while in this dynamic university community, he met J.F. Blumenbach whose guidance and ideas are discernible in all Ritter’s later work.

**Johann Friedrich Blumenbach (1752-1840): Variation, Environmental Determinism and Taxonomy**

Ritter met Blumenbach personally in September 1800. At this time, Blumenbach was internationally-known as a scientist and for his successful efforts to secure academic freedom at the University of Göttingen, by soliciting the protection of Hannover. His connections with the scientific community in England were extensive and important, and his correspondence with Joseph Banks and others revolved about his interest in travel reports and the development of his own anatomical, but especially craniological collection. He was interested in the problem of scientific taxonomy and like other scientists, was dissatisfied with the Linnaen system which he regarded as artificial and arbitrary. Natural history and taxonomy were the subjects of his conversation with Ritter or as Ritter himself records:

...hospitirte ich bei Blumenbach und besuchte ihn darauf...(i)ch bin jetzt auch ziemlich im Systeme der Naturgeschichte bekannt, und mit der zu ihr gehörigen Litteratur und Philosophie ein wenig, denn sie machte bisher meine Hauptbeschäftigungen aus, ist aber nun, als Studium, ganz auf die Seite gebracht. Du kannst dir also denken, daß ich wahren Gewinn von diesem langen Besuch hatte...Die Stufenleiter in der Natur, das Systemwesen, Bonnet, Götze und Buffon waren die Hauptgegenstände des Gesprächs, über die ich ihm viel Interessantes verdanke (Ritter, 1800; Kramer, 1875, p. 75).

2...I attended Blumenbach’s lecture and visited him afterwards. Now I am also fairly well-versed in the system of natural history and have a little familiarity with the associated literature and philosophy; previously they were my main preoccupation, but as a subject of study, they have now been put aside. So you may imagine, that I have benefitted truly from this long visit...The stepladder in nature, the essence of the system, Bonnet, Götze, Buffon, were the main subjects of the conversation, about which I have learned much of interest."
Blumenbach was a polymath, but his work focussed on the natural sciences and comparative anatomy. The range of his interests is aptly described by Ritter who provides an interesting account of Blumenbach’s laboratory/office.

Wie zu Eingeweihten tritt man, den schon an der Treppe eine schottische Basaltsäule verkündigt; überall sind in einer gelehrt Unordnung die Dinge zerstreut, die gerade seine Aufmerksamkeit beschäftigen. Hier ein Repositorium voll Hirnschädel, in denen er mehr gelesen hat, als in einem größern Bücherschrank voll Folianten über diese Materie, dort zur vergleichenden Anatomie eine gleiche Sammlung von Tieren; hier auf dem Studirtische eine Brodfrucht in Spiritus, dort das Schnabeltier, u.s.w.: doch was soll ich noch alles nennen? (Ritter, 1800; Kramer, 1875, p. 75).

Species and Degeneration

Blumenbach was an established leader in Göttingen. He completed his doctoral studies there in the early 1770s and became Professor of Medicine in 1776. His reputation was established by his widely read doctoral dissertation entitled “De generis humani varietate nativa,”—Concerning the Natural Differences of the Human Species, 1775, which went through three editions, including a German translation in 1798. The main question of his thesis preoccupied him for most of his life. Blumenbach sought to establish whether the physiognomic differences of mankind should be explained by several original species of man, or whether physiognomic variations were degenerations from one original species. Was man one species, or several?

As a comparative anatomist, Blumenbach defines the term "species" as including all animals whose form and constitution are so similar that differences can be explained by the known elements of degeneration (Blumenbach, 1795, tr., 1865, p. 189). Species were distinguished not by reproductive ability, but by anatomical analogy and resemblance (Ibid., p. 190). His human anatomical studies suggested further that the diversity of the human race shared the same causes as diversity of other domesticated animals, and by invoking Newton’s doctrine of sufficient cause he argued that degeneration was sufficient to explain the physiognomic diversity of

3“It’s like an initiation proclaimed by a Scottish basalt column on the stairway. One finds generally scattered in a scholarly disorder, all the things which occupy his immediate attention. Here a set of shelves full of skulls, in which he has read more than in a large bookshelf full of tomes of this material, there, a similar collection of animals for the comparative anatomy, here on the study table a breadfruit in alcohol, there , and so on. Certainly I could go on, but what else should I name!”
mankind and that we should not admit other arguments derived from a belief in the "...plurality of the human species" (Ibid., p. 191).

Degeneration is the crucial term in Blumenbach’s system. It denotes transformation from an original form or type. Zoological varieties, which are distinguished by colour, hair texture, stature, proportions and skull shape, emerged within a species because of external determining factors that act physiologically. In his *Über den Bildungstrieb und das Zeugungsgeschäft*—Concerning the Formative Force and Reproduction, 1781, Blumenbach argued theoretically that variation occurred by alteration of a *Bildungstrieb*—a formative force, which can be detected, like gravity, only by the determinate forms of matter which it structures (Blumenbach, 1781, p. 13). This force, which Blumenbach distinguishes from the mystical *Kräfte* of Herder and others, is deviated physiologically by the effects of external stimuli such as climate, diet, and mode of life—i.e. habits acquired through civilization (Blumenbach, 1795, tr. 1865, pp. 196ff.). This is a theory of environmental determinism explained through human or animal physiology. Elsewhere Blumenbach refers to Hippocrates’ *On Air, Water, and Soil*, but he does not depend on this work as support for his own theory. Instead he cites Kölreuter’s transmutation experiments with prolific hybrids which established to Blumenbach’s satisfaction that:

...the continuous action, carried on for several series of generations of some particular stimuli in organic bodies...has great influence in sensibly diverting the formative force from its accustomed path...[and]...is the most bountiful source of degeneration, and the mother of varieties properly so-called (Ibid., p. 196).

He concluded from this and his own study of human variations that only one species of man existed, and that all observed variation was attributable to degeneration from one original race. This race was the caucasian, but the conclusion was not mere cultural centrism, but rather the result of laborious and extensive comparative craniological work as catalogued in his *Collectionis suae cranium diversarum gentium decades*, 1790-1820. The caucasian skull was understood by Blumenbach as the mathematical mean of all structural occurrences of human skulls. Blumenbach also established a division of races which included the caucasian, mongolian, aethiopian, american and malay. His conclusions were of considerable importance in his time. Blumenbach was an anti-slavery proponent and attacked the polygenetic view which was often accompanied by theories of racial superiority (Kremer, 1981, p. 128).
Taxonomic Problems

Ritter’s taxonomic discussion with Blumenbach may have included Blumenbach’s views on environmental causation and variation of species, for Blumenbach argued that taxonomy should be derived from an holistic understanding of a species and its habitat, or what he calls its *Totalhabitus*. Blumenbach characterized the Linnean system as an artificial (künstlich) system which was limited by its reliance on single distinguishing features (einzelnes Merkzeichen) (Blumenbach, 1795, tr., 1798, p. xx). Blumenbach searched instead for a system based on broader consideration or what he called a *natural system*. According to Oscar Schmidt, Blumenbach was the first to employ this term *natural system* to distinguish his taxonomic thinking from the Linnean (Schmidt, *ADB* 2: 750). In a letter to Sir Joseph Banks published in the German translation of his dissertation, he describes the Linnean method as useful in its categorizing of mammals according to arrangement of teeth, but he suggests that:

> [es]...jetzt, nachdem so viele und so wichtige neue Gattungen dieser Ordnung entdeckt worden sind, sehr mangelhaft ist, und ungeheuer viel Ausnahmen erfordern würde, zu verlassen, und statt jenes künstliche Systems, ein natürlicheres von dem ganzen Habitus der Säugthiere hergenommenes, aufzustellen (Blumenbach, 1795, tr. Gruber, 1798, p. xviii).

Mammals, like other species, were to be classified according to an understanding of their characteristic features which were adaptations to environmental conditions.

Blumenbach followed taxonomic development with great interest. He studied the work of Buffon and Bonnet who promoted the principle of continuity and the chain of being. Despite his criticisms of the Linnean system, he was not uncritical of the chain of being as a taxonomic device. The chain of being had certain advantages of simplicity, both as an aid to memory and as a guide for research, but its real existence was problematic. By the end of the eighteenth century, the chain had become unwieldy as the number of known species continued to increase. Very complex intertwined chains were offered as solutions, as were idealistic versions, which reduced phenomena to base geometric forms. Blumenbach observed that serious and

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4"...now, after so many new and important species of this order [mammals] have been discovered, [the system] is very defective and an enormous number of exceptions are required. We must take leave of this method and arrange instead of that artificial system, a natural system taken from the mammal’s entire habitus."
prejudice-free investigation showed that the "Schema der Stufenfolge"—the scheme of the stepped-sequence, resulted in serious ordering difficulties. For example, the differences between the sexes of an individual species are often so great, that their relative location in the stepladder were very different (Ibid., p. xviii). But Blumenbach, like Kant before him, recognized explicitly the obvious practical utility of the apparatus.

...so gebe ich doch sehr gern das zu, daß diese metaphorischen und allegorischen Spiele einen unlängbaren Nutzen für die Erleichterung der Metho[d]e in der Naturgeschichte haben (Ibid., p. xix).5

Blumenbach was critical of the dubious external analogical thinking of physicotheologians and of the scientists Vallisneri, Oehme and Bonnet. But, he was willing to concede the usefulness of the chain, if properly based on proper comparative anatomical work. In the first years of the nineteenth century, the scientific societies in Rouen and Haarlem invited comment to determine whether the chain had any real foundation in nature. Blumenbach cites De Luc’s metaphysically reasoned rejection of the idea but writes that his own criticism of the idea:

...is only to be regarded as a warning against the misuse of the common conception of gradation, according to the outward form of creatures under the favourite images of ladders and links...since... the very greatest use may be made of this metaphorical image not only towards the exercise of observation, but also with the greatest advantage towards the regular use of a natural system in the description of nature, and also for the most advantageous arrangement of natural collections (Blumenbach, 1806, tr. Bendyshe, 1865, p. 317).

Blumenbach rejected the real existence of the chain in nature and did not adopt an idealistic version. But Blumenbach did not reject its use altogether if its taxonomy were based on the broader consideration of a creature’s Totalhabitus.

Göttingen and Travelling Scientists
Blumenbach played an important role in stimulating and directing geographic research. Göttingen was a well-known centre for the preparation of research trips and the library possessed an accumulated wealth of travel notes and literature. These notes were

5"...so I am happy to admit that these metaphoric and allegoric games do have an undeniable use for facilitating the methods in natural history."

134
important to Blumenbach's ethnographic and comparative anatomical investigations, but he also had a passion for travel literature, read works repeatedly, and made numerous extracts which he indexed geographically, chronologically and alphabetically (Marx, 1840, tr. Bendyshe 1865, p. 21). Blumenbach encouraged students to work with these materials to bring forth useful critical compilations and he shared with Reinhold Forster, an interest in teaching world travellers the method of proper scientific observation, so that the product of their travels, could be reliably and easily integrated into general science. His short work "On the Best Methods of Putting Together Collectanea and Extracts," was dedicated to that aim. Blumenbach's efforts were not without effect. He numbered among his students F. Hornemann and A. von Humboldt as well as other eminent travelling scientists such as von Neuwied, Langsdorf, Seetzen, Röntgen, and Sobthorp (Marx, 1840, tr. Bendyshe 1865, p. 21).

Ritter should be included among a long list of individuals influenced by Blumenbach for he considered himself a student of Blumenbach by virtue of his years of study in Göttingen during the preparation of the Erdkunde. Blumenbach's important influence is reflected in Ritter's lasting commitment to the production of critical compilations of geographic information. Ritter's procedure of compiling travel notes and information parallels the mechanics of Blumenbach's own method of indexing and compiling. According to Hanno Beck, Ritter arranged travel reports and other materials in chronological order on his desk, and worked from the oldest to the most recent and compared the reports for contradictions and corroborations, thereby creating a series of chronological planes which Ritter called "vergleichende Zusammenstellung"-comparative compilation (Beck, 1979, p. 116). Likewise Ritter described his Europa, 1804, as an attempt to create an index for the states of Europe.

Ritter gained many other ideas from Blumenbach. In addition to the concept of physiologically induced variation of species and the environmental elements which gave rise to such variation, e.g. climate, diet, mode of life, Ritter also gained an appreciation for Blumenbach's natural system of taxonomy based on an animal's Totalhabitus. The comparative method was fundamental in Blumenbach's craniological investigations and his classification of human races was linked to the concept of an original racial form which could be derived by comparative measurement and the computation of a structural mean. There is no evidence that Blumenbach understood the man-land unit as a unit for comparative analysis in geography, but when Ritter later sought to
analyse variations of human groups according to natural conditioning features such as climate, soil, etc., he described this as "physiological geography" in order to clarify the intent of his general comparative geography (Ritter, 1817, p. 21). Ritter’s suggested reduction of phenomena into ideal forms or "Grundtypen" might also be understood as base forms from which all else has degenerated and his concept of a natural system was linked to these ideal forms. Ritter was advised by Blumenbach against adopting the chain of being uncritically as a taxonomic devise.

Samuel Thomas Sömmering (1755-1828): Polygenetic Theory and the Chain
In October 1800, Ritter returned to Frankfurt and met several important men who had come to Frankfurt for the wedding of Bethmann-Hollweg’s daughter (Kramer, 1875, p. 78). These included J.H. Jacobi and Heinse who were librarians for the Archbishop of Mainz, but of lasting importance to Ritter was his acquaintance with the comparative anatomist S.T. Sömmering who was a brother-in-law of the bride. Two years later, in 1802, after the death of Sömmering’s wife, Ritter came into closer contact with Sömmering by agreeing to include his son Wilhelm in his instruction in the Bethmann-Hollweg house, and in 1805 when Sömmering followed a call to Munich, Ritter was fully entrusted with Wilhelm’s upbringing. Ritter’s acquaintance with the older Sömmering grew into a life-long friendship which had important scientific significance for Ritter. In addition to Ritter’s introduction to comparative anatomy, Sömmering also played a role in Ritter’s first meeting with Schelling in Munich in 1812, the consequences of which have yet to be analysed definitively in Ritter’s work (see Kirschke, 1983).

Like Blumenbach and Ebel, Ritter included Sömmering in the dedication to the second volume of the Erdkunde. In the introduction to volume one, Ritter writes that he is indebted to Sömmering for "...das Verständniss der Gesetze des geographischen Verhältnisses der ganzen belebten Natur"—the understanding of the laws of geographic relation of the entirety of living nature (Ritter, 1817, p. 44). He also acknowledges Sömmering’s important role in the structuring (Anordnung) of the Erdkunde:

Wenn hierin etwa hie oder da in gegenwärtiger Anordnung eine interessante Aussicht hervortreten sollte: so verdankt der Verfasser diese ganze Richtung seiner Aufmerksamkeit dem vieljährigen, belehrenden, und, mit stolz sey es
In 1822, Sömmerring acknowledges the continuous role he played in the conception and development of Ritter’s *Erdkunde* when he writes:


Sömmerring recognized Ritter’s *Europa* as a first attempt at structuring geographic information which was later perfected in the *Erdkunde*.

Sömmerring studied anatomy in Göttingen where he befriended and studied with Blumenbach (Jännicke, *ADB* 34: 611). Sömmerring completed his dissertation in 1778 entitled "De basi encephali originibusque nervorum," which advanced the theory that mental capacity of animals, including man, could be measured by determining the ratio of brain-weight to the weight of the remaining nervous system. This thesis, which Sömmerring claimed as his own discovery, formed the basis for his controversial theory of race. Sömmerring produced numerous illustrated anatomical atlases of lasting value, and is remembered not only for work leading to the discovery of the optic nerve junction, but also for his discovery of the electric telegraph in 1809. Above all, he is remembered for his racial theory, that of all the races of man, the African race most closely approached that of the apes.

This "ape-affinity" theory was first published in a short article entitled Über die körperliche Verschiedenheit des Mohren vom Europäer—Concerning the Anatomical Difference of the Moors from the European, 1784. This was further elaborated and

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6"In the present structure should an interesting view arise every now and then, so the author owes this entire direction of his attention (Aufmerksamkeit) to the many-yeared, instructive, and let it be said with pride, entrusted relation (Umgang) with a noble man, S.Th. Sömmerring, who is named as a jewel of his century and his nation."

7"Ritter’s new enlarged-by-half edition of his *Erdkunde* gives me great pleasure. The first edition has already aroused the greatest admiration in London, Paris, Petersburg, Vienna; certainly not a new work, but triginta annorum. Already twenty years ago had he the kindness to tell me about the manuscript."
clarified, perhaps in response to Blumenbach’s criticisms, in his Über die körperliche Verschiedenheit des Negers vom Europäer—Concerning the Anatomical Difference of the Negro from the European, 1785. Sommerring was aware of the implications of his theory for the slavery debate and the emergent racist theories in Britain and the United States. But despite the use to which his theory could be put, Sommerring stood by his dispassionate scientifically derived findings. He writes of his work that:

...je mehr ich diese Untersuchung kaltblütig fortsetzte, desto mehr ward ich gewahr, daß dies sichtlich vom Neger gelte (Sommerring, 1785, p. xix).

Sommerring acknowledges the use of his theory as a justification for tyranny, but notes that he could not avoid this misunderstanding and misapplication (Ibid., p. xix). Sommerring argued that his theory did not necessarily support polygenetic theory—the theory that each human race was descended from its own ancestral couple—but rather, Sommerring argued like Blumenbach, that both the black race and the white race were descended from "...einem gemeinschaftlichen Stammvater"—a common progenitor (Ibid., p. xx).

In part, Sommerring’s conclusions were based on the same comparative methods Blumenbach employed in his own attempts at racial differentiation and classification. Like Blumenbach, the process of degeneration played an important role in explaining variation. Sommerring does not explain this process, but in a later work Lehre von den Knochen und Knorpeln—Concerning Bones and Cartilage, 2nd ed., 1800, the process is physiological and conditioned environmentally. In this comparative analysis of human bones and skeletal structure, Sommerring argues that qualitative and morphological differences can be explained, in part, by differences in food (Nahrungsmittel) which create chemical differences in bone physiology. This process is supplemented by differences in the "mode of life" (Lebensart) (Ibid., 1800, pp. 112-118).

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8Blumenbach to Sommerring, 16 Jan. 1785: Blumenbach disputes the idea of less mental capacity and also argues that the physical differences between Europeans and Africans are not that great (Wagner, 1844, pp. 304-5).

9For an excellent summary of these theories and their connection with Carl Ritter’s later work see Peter Kremer, 1981.

10"...the more I cold-bloodedly I continued this investigation, the more I became aware that this visibly applied to the Negro."
13). Unlike Blumenbach, Sömmerring’s conclusions are derived from his less critical use of the chain of being suggesting that a series of intermediate forms must lie between the apes and humans. For reasons quite different from those put forward by Blumenbach, Sömmerring argues that the European human form was the measure of all comparison (Sömmerring, 1800, p. 89). The European race was not an anatomical mathematical mean as in Blumenbach’s thinking, but the most consummate creation—the highest rung of the terrestrial portion of the chain of being. The hierarchical and hegemonic implications of Sömmerring’s thinking cannot be ignored.

Like many other scientists of his generation, Sömmerring found great stimulation in Herder’s comparative anatomical thinking and the associated role of physical environment in the physical differentiation of man. Equally important was Herder’s promotion of the chain of being in nature. Kant’s critique of Herder’s Ideen, 1784 is well-known, but Blumenbach had also noted its "scientific shortcomings" and Lichtenberg "...condemned it as scientifically inadequate" (Nisbet, 1970, p. 325). On the other hand, Sömmerring praised the work highly and found support for his "ape-affinity" theory by paraphrasing Herder’s discussion of racial differences.

Alles, was wir in der Schöpfung kennen, hängt durch Nuancen zusammen, vom Menschen bis zum untersten Affen! (Sömmerring, 1785, p. xvi).11

For Sömmerring there was a hierarchy of intellectual capacities among human groups and the European was decisively higher than the Negro (Ibid., p. 67). Sömmerring’s application of the chain of being was not confined to racial differentiation. Even more exotic was his application of the theory to the anatomical analysis of human deformities.

In his Abbildungen und Beschreibungen einiger Misgeburtten--Illustrations and Descriptions of Some Freaks, 1791, Sömmerring employs literally the principle of continuity arguing that just as there is a stepped-sequence and natural order in proper creations of nature, so too is there:

11"Everything which we know in the creation, hangs together through nuances, from man down to the lowest ape!"
Sömmering carries out an anatomical analysis of a series of deformed human specimens which he examined in the anatomical collection of the Collegium Carolinum. He argues that such deformities reflect a natural sequential ordering. He arranges a series of drawings which show in precise order: (1) a human head with two eyes and a separated nose; (2) a broadened human head with two eyes and two noses; (3) a further broadened head with four eyes two noses and three ears; and finally; (4) two distinct heads, all of which have been found on single bodies. The seriousness to which he remains committed to his theory of a continuously graduated series of deformity, is punctuated by the inclusion of a drawing of a one-eyed pig, which completes, as it were, an otherwise empty position in the stepped-sequence, substituting for a yet unfound human specimen. Sömmering does not offer a precise theory to explain why these deformities arise, but after enumerating and criticizing existing theological, metaphysical, and physical theories, he suggests dogmatically that this hierarchical ordering must lie at the base of a satisfactory theory, for this precise natural ordering observes "...einen bestimmten Gang und Einformigkeit..."--a distinct operation and uniformity (Ibid., 1791, p. 38). And this must be so, as he explains because "...die Natur nicht ins Unendliche spielt"--nature does not play ad infinitum (Ibid., 1791, p. 38). Sömmering means that there are a limited number of models or prototypical forms in nature, upon which all creation is modelled. The important task of comparative anatomy is to reveal these underlying "Ur-forms."

Like Blumenbach and many other comparative scientists of the time, Sömmering’s comparative method was conceived as a method of iterative refinement of observations so as to derive ideal models or prototypical forms. He writes in his Abbildungen des Menschlichen Hörorgans--Illustrations of the Human Organs of Hearing, 1806, one of several anatomical atlases that were designed for doctors and scientists who had limited access to actual human specimens, that:

Nachdem ich diesem trefflichen Künstler die Hörorgane sowohl im Ganzen als in Einzelnen, in dem Zustande, in welchem sie sich wahrscheinlich im Leben befinden, dargelegt und erklärt hatte, verglichen wir alles mit meinen älteren

12v "...a stepped-sequence and natural order to discover and explain (darzulegen), even in the deformities of our bodies."
Zeichnungen und den vorzüglichsten Abbildungen anderer Schriftsteller. Aufs
genaueste ward sonach alles ausgemessen, in Rissen entworfen, und nach
nochmaliger Vergleichung mit dem Präparate diejenige Form abstrahirt, welche
im Modelle füglich für die allgemeinste und vollkommenste gelten konnte (Ibid.,
1806, p. iv).13

His intention is clearly to synthesis general abstract models by iterative refinement.
The practical utility of the approach is suggested explicitly by his further remark that:

Die wahre Form mancher Theile ergiebt sich wahrlich, ausser der Vergleichung
vieler Exemplare, erst bey der Vergrösserung, beym Durchschneiden, und
Wiederzusammensetzen, so wie es diese Art vor Arbeit erfordert. Wenigstens
vor aller einseitigen Wahrnehmung ist man durch solches Nach bossiren völlig
gesichert. An neuen Entdeckungen konnte es mitunter auch nicht fehlen
(Sömmerring, 1806, p. iv).14

Clearly his comparative method like those of his contemporaries was of great practical
utility.

Sömmerring wrote other ponderous works including a rationalist attempt to
deduce "transcendentally" the location of the soul in the body, Organ der Seele--Organ
of the Soul, 1796; and while in Paris he published an anatomical analysis of death by
the guillotine Ueber den Tod durch die GuiUotine--Concerning Death by the Guillotine,
1795. There is no evidence that these works were of importance to Ritter.
Sömmerring's anatomical atlases were probably more interesting to Ritter by virtue of
his own interest in drawing and engraving, and in the production of visual material for
instruction. Ritter would have grasped the significance of Sömmerring's remarks
concerning the object and process of comparative study that were appended to these
atlases.

13"After I explained the organs of hearing to this excellent artist, as a whole and
in detail, and in the situation they are likely to be found in life, we compared
everything with my older drawings and with the most excellent illustrations of other
writers. Everything was dimensioned, put in sketched plans, and after further
comparison with the dissected specimens, we abstracted that form which could best be
generally and most consummately taken as the model."

14"The true form of many parts is derived of course, apart from the comparison of
many samples, only from enlarging, dissecting, and reassembling as is necessary in this
type of work. At least, one is fully protected by such modelling from one-sided
perception. In addition, new discoveries could also be made once in a while."
No doubt Sömmering’s racial theory was of interest to Ritter both in terms of the theory of environmentally-induced human variation, but also in its rejection of polygenetic theory. Ritter’s later conception of continental individualities bears a close relationship to polygenetic thinking. In his later work, Ritter refers to the African as an "isolirten Urstamm"—isolated prototypical race (Kremer, 1981, p. 130). But, like Sömmering, Ritter equivocates and does not take a decisive stand as to whether the Africans migrated to Africa or whether they originated there. Peter Kremer has explored this question thoroughly and notes that while the affinity of Ritter’s geographic thinking to polygenetic theory is apparent, there were many respectable writers who held polygenetic ideas but did not sympathize with slavery and racism (Ibid., p. 130). Kremer concludes that Ritter turns unequivocally against polygenetic theory once the course of application became clear. Ritter was never a proponent of slavery.

Johann Karl Freiesleben (1774-1846): Mineralogy and Synthetic Comparison

In Autumn 1801, Ritter travelled to Leipzig and Sangerhausen, in the company of the two Bethmann-Hollweg children and their father Johann Hollweg who had mining interests there. Ritter used this opportunity to visit his sister and two older brothers in Leipzig, and to visit friends in Halle (Kramer, 1875, p. 82). His prolonged stay in Sangerhausen, on the southeast edge of the Harz, provided Ritter the opportunity to study mining and meet geologists and mining experts. Perhaps the most eminent among these was Johann Freiesleben who was director of mines (Bergvoigt) in Thuringia and who had already published several geologic treatises including works written jointly with Alexander von Humboldt (Ibid., p. 83). Several elements of Freiesleben’s thinking were important to Ritter. These include his use of Werner’s diluvialist precipitate theory, his associated system of mineral taxonomy, and his belief in the geographical recurrence of similar mineral successions—a belief which suggests the utility of the comparative method. Freiesleben’s use of the method is linked directly to study of these successions which he compares, refines and abstracts into mineral taxonomies. The spatial component of this comparative work—his observation of mineralogical descriptions of similar successions in spatially distinct geologic complexes—is referred to by Freiesleben himself as "mineralogischen Geographie"—mineralogical geography (Freiesleben, 1807, p. viii). For Freiesleben, geognosy was the study of rock affinities and positions within these individual complexes (Ibid., p. 4).
Freiesleben was five years older than Ritter and five years younger than von Humboldt. When he arrived at the Bergacademie in Freiburg-im-Breisgau in 1790, he already had practical experience in mining. He grew up in a mining family in Freiburg and laboured for some time at the mine face. At the Bergacademie he was a student and protégé of Werner, the director of the academy who was at the height of his effectiveness in Germany. Freiesleben gained recognition as Werner's most knowledgeable disciple, and the most important source for disseminating his ideas. According to one authority, Freiesleben furthered, completed and deepened the understanding of stratified rock formations in the Wernerian sense, by precise portrayal of stratified rocks in the Thuringia and Mannsfeld complexes and comparison with other complexes in other areas. (Gümbel, ADB 7: 340).

In his student years in Freiburg, Freiesleben befriended both von Humboldt and Leopold von Buch who were fellow students in the Bergacademie. In 1790, Werner assigned Freiesleben the task of accompanying von Humboldt to the mines, where they became good friends. They travelled together in 1791 on a research trip through the Bohemian Mittelgebirg, the results of which were published in the *Bergmännischen Journal*, 1792 and the *Magazin für die Bergbaukunde*, 1793. The two geologists were of similar mind and travelled again with more important results in 1795. They observed the occurrences of limestones in the Savoy and Swiss Jura, and compared them with those in Thuringia where Freiesleben had specialized knowledge from his travels with von Buch and von Schlotheim in 1792. The results of the Swiss trip resulted in alterations to existing rock classification and was published by Freiesleben in *Neue Schriften*, 1801. The comparative method they employed became the foundation of both Freiesleben's and von Humboldt's most important later works.

From 1792-1795, Freiesleben studied law in Leipzig and familiarized himself with the Harz by repeated short field trips. This culminated in his *Bergmännisch mineralische Beschreibung des Harzes*—Miner's Mineral Description of the Harz, 1795, and a short work on the well-known phosphorescent (schillernde) fossils of Baste (Gümbel, ADB: 339). After five years of progressive responsibility, Freiesleben was appointed Bergcommissionsrath (mining advisor) in Eisleben (about 10 miles east of Sangerhausen). There was little time for writing in this period, but Freiesleben found time to contribute to von Humboldt's *Unterirdischen Gasarten*—Subsurface Gas-Types,
which was published in 1798. Freiesleben's most important work best illustrates his comparative, geognostic thinking. The work was dedicated to Werner and was entitled *Geognostischer Beytrag zur Kenntnis des Kupferschiefergebirges mit besonderer Hinsicht auf einen Theil der Grafschaft Mannsfeld und Thüringen—Geognostic Contribution to the Knowledge of Copper Exfoliation with Special Reference to the Mannsfeld and Thuringian Counties, 1807*. The work had a dual intent, or as Freiesleben described it:

...theils einen Beytrag zur näheren Kenntnis der Kupferschiefergebirgsformation im Allgemeinen...theils der mineralogischen Geographie einer Provinz meines Vaterlandes...*(Freiesleben, 1807, p. viii).*

This geognostic study of the relative positioning of minerals within the exfoliated copper complex was refined by comparative investigation of other complexes. Freiesleben begins by adopting the Wernerian diluvialist and precipitate theory to explain a stratigraphic succession within the complex. This succession forms a "chain of minerals" and he explains that the term "Kupferschiefergebirge"--exfoliated copper rocks, is to be understood as a classification concept *(Ibid., p. 7).* He observes that this formation consists in a chain of rock types *(Gebirgsarten)* not always observable in its entirety, whose sequential links are never discovered out of proper order.

...man sieht, sie machen eine Kette von Gebirgsarten aus, deren Glieder man zwar absolut-isolirt, aber wohl nie isolirt in andere Gebirgssuiten versetzt, finden wird, ob man schon selten die ganze Gliederreihe in der angegeben Ordnung und noch weniger alle Glieder in einer Gegend vollständig zusammen trifft *(Ibid., p. 8).*

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15"...partly a contribution to a better knowledge of copper slate exfoliation formations in general...partly to mineralogical geography of a province of my fatherland...”

16"Gebirgsarten" is transliterated as "mountain types." Within the context of mineralogical classification it may be rendered better as "rock types."

17"...one sees that they constitute a chain of rock types whose links one will find in absolute isolation, but which probably one will never find in a different position in other locations, even if one has seldom encountered completely the entire series of links in the asserted order, or even less seldom encountered them in their entirety in one particular area."
He then explains the observed rock sequence as a rock taxonomy differing from those of several other geologists including: Lehmann, Voight, Karsten, Werner, von Buch, von Humboldt and Heim. Likewise he corrects his own earlier system by comparing a growing number of individual successions.

In his early travels with von Humboldt in 1791, and especially with von Buch in 1792, he claims to have observed exhaustively "..die ganze Kette"--the entire chain and he includes seven distinct classes to correspond with the observed rock layers (Ibid., p. 15). After a later trip with von Humboldt in 1796, he revised this to eight categories. In 1807, possibly influenced by the Thuringian geologist J.L. Heim and his own continued geognostic comparisons, he reduced them to four main taxonomic categories. The categories also were defined as ideal forms.

Ich werde zuvörderst versuchen, den Character der einzelnen Glieder ohne locale Beziehung als eine von den verschiedenen in der Natur bemerkten Verhältnissen abstrahirte ideale Darstellung, ohngefähr so fest zu stellen, wie der Oryctognost ebenfalls nur in der Idee den Gattungscharacter eines einfachen Fossils abstrahirt, ohne, wie Hr. Mohs irgendwo sehr richtig bemerkt, sich dadurch irren zu lassen, daß nicht jedes Individuum der Gattung den Character derselben vollständig repräsentirt (Ibid., p. 22).  

The details of Freiesleben's taxonomy need not be explicated. What is of importance was the manner in which an abstract taxonomy was derived through geognostic comparison of several regional mineral complexes (Freiesleben, 1807, pp. 42-60). The remainder of the book was devoted to analysing exhaustively the subcategories of his comparatively derived taxonomy.

Ritter had personal knowledge of Thuringia and the Harz both through his early formal training in Schnepfenthal including field trips into the Thüringer Wald, from travels through the Harz as a child travelling to and from Quedlinburg and Derenburg, and as an adult accompanying Horstig and Zerrenner who were very interested in nature observation. In view of Ritter's very considerable botanical knowledge, he would have

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18"I will attempt first to establish roughly the character of the individual links without local reference, as an ideal representation abstracted from the diverse relationships observed in nature, just as the Oryctognost likewise abstracts in his mind the character of a species from a simple fossil without, as Hr. Mohs somewhere very rightly remarked, being mislead by the fact that not every individual of that species represents entirely the character of the same."
been intrigued by a geological view of these regions and may have been induced to think critically about the connections between organic and inorganic nature within a regional context. Ritter's earliest concept of his *Sechs Karten* dates from this period (Engelmann, 1959, p. 104). Ritter does not cite Freiesleben in this work, nor does he employ his comparative method. Instead he cites Freiesleben's friend Alexander von Humboldt whose work on vegetation (1806) was perhaps more interesting to Ritter at this time. But in von Humboldt's work he encountered a similar approach to science derived from Werner and the Freiburg Bergacadmie. Like Freiesleben, von Humboldt's comparative work reduced multiple observations to a limited number of abstract taxonomic forms which he called *Hauptformen*—main forms. This was an important component of Ritter's later thinking. The origins of Ritter's *Sechs Karten* at this period is also linked more closely with Schnepfenthal than with Freiesleben. Schnepfenthal was Ritter's immediate destination after his stay in Sangerhausen. If he discussed Freiesleben and geology with Salzmann and GutsMuths, it would have been in the regional context of Thuringia and probably would have included a discussion about the work of J.L. Heim who was not only a well-known geologist in Thuringia, but also an important pedagogue.

**Johann Ludwig Heim (1741-1819): Geology and Analytic Comparison**

In May 1804 upon completion of the first volume of *Europa*, Ritter brought his students to Schnepfenthal with pedagogic problems on his mind. His journey to Thuringia was planned both to confer with Salzmann and GutsMuths about teaching problems and also to remove his students temporarily from what Ritter perceived as the corrupting influence of bourgeois Frankfurt. In 1804, Ritter considered his students' development to be unbalanced. With Johann Hollweg's permission, Ritter was searching for a place to stay for one year in order to educate his students in isolation and in closer communion with nature (Ritter, 1804, in Kramer, 1875, p. 88). This search took him from Frankfurt through Cassel, where he visited his sister and future brother-in-law, to Schnepfenthal and Meiningen (SSE of Schnepfenthal) where he met Consistorial-President Heim who was responsible for the Meiningen schools and who had worked earlier as an instructor for Prince George von Meiningen (Gümbel, *ADB* 11: 325). Heim was a foster parent of one of Ritter's most trusted friends (unnamed by Kramer, 1875, p. 89).
Heim was educated in the Lyceum in Meiningen and studied theology and mineralogy in Jena. He spent time in Straßburg where he engaged in further mineralogical study and was later appointed to the Consistorium in Meiningen where he progressed to President and in 1803 was named "Geheimer Rath"—privy councillor and became an important force in the principality. Heim is remembered for his geognostic study of the Thüringer Wald and for the valuable collection of mineral samples which he assembled and eventually entrusted to the University of Jena. Ritter was very impressed by Heim, and had studied Heim's work, prior to their meeting. Ritter described this visit to Meiningen and recorded his favourable impressions of Heim.

Ich lernte...eine Manner von Verdienst kennen und vorzüglich einen Mann, dessen Schriften ich studirt hatte, dessen denkenden Geist ich hier erst bewundern mußte, indem er mir manches aus dem reichen Schatz seiner Forschungen mittheilte, um das ich ihn bat. Es ist der Geheime Rath und Consistorial-Präsident Heim, ein großer Geolog, Naturforscher, Historiker, ein Mann voll Kenntnisse und Verdienst um sein Land, sonst Erzieher des letzterverstorbenen Herzogs und jetzt das Factorum im Lande (Ritter, May 1804; Kramer, 1875, p. 89).19

Heim published several geologic treatises. His most important work was his three-volume Geologische Beschreibung des Thüringen Waldgebirgs—Geologic Description of the Thuringian Forest, 1796-1812, which earned him recognition as an expert on Thuringia. This work, and the theory and methods it contained, were the main focus of Ritter's interest.

Of special interest were Heim's views concerning the aims and procedures of geology which differed from those of the Freiburg Academie. Heim differed in specific ways from Freiesleben, who was critical not only of Heim's results, but also his methods (Freiesleben, 1807, pp. 36-40). The most fundamental difference, lay in Heim's application of the comparative method to geology. The object of Heim's geology, was not the identification of mineral relationships, which he considered as a

19"I met some men of merit and above all a man whose writings I have studied, whose thinking mind I really only came to admire here as he imparted to me some of the treasure of his researches that I had asked him about. It is the Privy Councillor and Consistorial President Heim, a great geologist, natural scientist, historian, a man full of knowledge and merit in his land, also the educator of the late prince and now an important authority in the country."
branch of chemistry, but rather, like de Luc, geology was the history of the earth
considered as a planet among planets and comparison was therefore problematic (Heim,
1796, p. xxvii).

Unsere Erde als ein eigner Körper muß ihre eigne Naturgeschichte so gut haben,
as der Mensch, der Elephant, die Eiche u.s.w. Zwar können wir unser
Erdkörper nicht so mit Individuen seiner Gattung, mit den Planeten
zusammenhalten und vergleichen, wie dieses bey den Gattungen der Geschöpfe
im Thier-, Pflanzen- und Steinreich statt findet (Ibid., p. xxvii).20

Heim understood proper geology to be developed from the comparative analysis of
similar earth-like bodies.21 Since such comparison of the general natural history of the
planets, was not yet within our capacity, he argues that:

...müssen wir uns begnügen, die Naturgeschichte der Erde, ihren Bau, ihre
Bildung, und durch was für Veränderungen sie bis zu ihrem gegenwärtigen
Zustand gekommen seyn möge, aus ihr selbst zu erforschen (Heim, 1796, p.
xxviii).22

Heim’s suggestion that geologists must research from the earth itself and not by
comparison with other celestial bodies, means that the comparative method was not
applicable. In Heim’s time there was not much to compare.

The comparative method as applied by the Freiburg-Academie was not especially
useful for Heim. Heim believed a priori in the essential uniformity of the earth and to
research physical relationships in one part, was tantamount to studying relationships in
every other part. The earth exhibited the same essential construction throughout.

Uebrigens hat man, um den Zusammenhang in Gebirgen zu studieren, nicht
gerade nöthig jenseits der Meere zu reisen....Die wesentlichen Verhältnisse

20"Just as mankind, the elephant, the oak tree, etc., has its own natural history, so
too must our Earth as a body of its own. Truly we cannot view together and compare
our Earth with the other individuals of its species, the planets, as this is done with the
species of creation in the animal, plant and mineral kingdom."

21"This view gave rise to his "Ueber die Aehnlichkeit der ehemaligen Erdoberfläche
mit der gegenwärtigen des Mondes,"--Concerning the Similarity of the Earlier Earth
Surface with that of the Present Surface of the Moon," 1802.

22"...we must be satisfied researching from the Earth itself, its natural history, its
construction, and through what changes it has come to its present state."
bleiben sich überall gleich; und auf die kleinen Differenzen kommt es vor der Hand nicht an (Heim, 1803, p. 9). 23

Heim was a diluvialist who explained rock stratification as the result of sequential chemical precipitations from a primordial ocean. He argues that the earth consists of rock masses of different types and these types are called rock strata. For Heim, position and rock type are synonymous, for each stratum was laid down in the same manner and at the same time over the entire earth.

The principle of continuity also plays an important role in Heim's thinking. Because of the simultaneity of precipitation, Heim supports Buache's theory of the continuous interconnection of all terrestrial highlands. He is aware of geographic irregularities in rock strata and observes that some strata are confined to small areas while others:

...sich weit ausbreiten und fast über die ganze Erde hin, in einem ehemaligen jetzt unterbrochenen Zusammenhang gestanden zu haben scheinen...(Heim, 1796, p. xxix; see also comments, 1806, p. 4). 24

This concept of continuous interconnection is also expressed in his understanding of the vertical transition between strata, which he considers as "allmählig und stufenweise"—gradual and step-wise (Heim, 1798, p. 309). Heim's commitment to the principle of continuity as a natural ordering device is dogmatic and may be derived from his mid-eighteenth century theological education. He writes at the outset of his study that:

Der Geolog kann keine andere Ordnung annehmen und befolgen als die natürliche, und wenn diese noch nicht gefunden ist, und auch niemals solte gefunden werden können, so bleibt nichts übrig als sie durch Vermuthungen oder wie die Quadratur des Zirkels durch Approximation zu suchen. Daß sie

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23"Moreover, to study the interconnection in mountain complexes, one need not travel beyond the sea....The essential conditions are the same everywhere; and the small differences do not really matter, at first."

24"...spread themselves out widely almost over the entire earth and appear to be standing in an earlier, now interrupted interconnection."
Heim's mineralogical taxonomy is characterized by continuity, but unlike Freiesleben and the Freiburg Academie, it is their stratigraphic position alone which is most important, not their chemical affinities. Mineralogy, which he associates with the Freiburg-Ácadamie, is an auxiliary science to geology but certainly not geology itself (Ibid., p. xxix).

Despite Heim's remarks about the unsuitability of the comparative method, Heim undertook comparative work and prescribed comparative thinking. But his approach differed from that of Freiesleben and von Humboldt who sought to refine models of mineralogical succession by repeated observation. Heim describes the comparative method as a tool of analytical dissection of geologic areas with the aim of understanding its mechanics. An individual area was dissected and its parts were compared with one another to reveal the laws of their connection. Heim describes this process as "...die geographisch analytische Methode..." and explains that it "...ist die erste Stufe der Induction, nach welcher Gebirgslager beschrieben werden sollten (Heim, 1799, pp. 8-9)."

Once the laws of connection were revealed, then they could be extended to other areas to produce a larger holistic system. In his comparison of Inselberg and Schneekopf, both of which are located in the Thüringer Wald, he explains that:

Auf dem Wege der Induktion muß man immer zurücksehen, und das vorliegende mit dem zurückgelegten zusammenhalten, um von Beobachtungen einzelner Theile und Strecken durch fortdauernde Zusammenstellung stufenweise zu höheren Punkten zu gelangen, von welchen sich ein immer größer werdendes Ganzes übersehen läßt (Heim, 1799, p. 326).

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25"The geologist can accept and follow no other order than the natural. And if this is not yet found, and possibly never may be found, so there is no other way than to seek it through speculation, or, like the quadrature of the circle, through approximation. That it really exists, one may, as I believe, trust with certainty to nature."

26"...the geographic analytic method...is the first step of induction, according to which rock strata should be described."

27"In the method of induction, one must always look back and view together the present with its antecedents, so that from observations of individual parts and sections and through continuing compilation, higher points can be reached stepwise from which
Unlike the Freiburg Academie, Heim sought to examine several geologic complexes in order to discover additional laws of connection, rather than to refine a given theory. His emphasis remains linked to analytical dissection. This is clear in his criticism of the application of this comparative model in existing geognostic practice or as he argues:

Um den Bau des menschlichen Körpers kennen zu lernen, hat man bey der Zergliederung desselben Anfangen, die Beschaffenheit, Gestalt, Lage, Zahl und andere Verhältnisse seiner Theile beobachten und vergleichen müssen. Hätte man sich damit begnügen wollen, von den Körpem aller Nationen, die gleichnamigen Theile zu sammeln, und in Fächer zu bringen, so würde man in der Anatomie nicht weiter gekommen seyn, als man es in der Geognosy ist (Heim, 1803, p. 9).

Heim’s work was criticized by Freiesleben in 1807. He argued that Heim’s taxonomy of rocks is deficient because he treats it geognostically, i.e. by position, rather than mineralogically, by rock characteristic (Freiesleben, 1807, p. 36). Freiesleben objected to Heim’s system also because it lacked a regional comparative base (Ibid., p. 41). But as Freiesleben conceded, Heim’s system produced accurate representations of individual areas (Ibid., p. 40). Clearly, the methods and the aims of the two geologists were somewhat different.

Ritter probably found Heim’s work very congenial by virtue Heim’s use of pedagogic terminology. Ritter’s Erdkunde is cast in precisely this same mould. For example, Heim writes that he wants to make the reader’s understanding of the geographical and mechanical interconnections of the Thüringer Wald as anschaulich—vivid, as possible (Heim, 1798, p. 236). In a discussion of rock-types Heim states that he wishes to describe their step-wise (stufenweise) development deutlich—distinctly (Heim, 1796, p. xvii). He contrasts deutlich knowledge with knowledge that is

an ever larger whole can be viewed."

28"In order to learn to know the human body, one must begin with its dissection. One must observe and compare the properties, form, position, number and other relationships of its parts. If one had wanted to be satisfied with collecting the corresponding parts of bodies from all the nations, and [neatly] putting them into drawers, so one would not have come any further in anatomy than one is [at present] in geognosy."
Ritter's *Sechs Karten von Europa mit erläuterndem Texte*—Six Charts of Europe with Explanatory Text, 1806

In late summer of 1806, Ritter published an atlas which he first announced in his *Europa* in 1804. It consists of six thematic maps, each accompanied by explanatory texts. The atlas was first conceived as early as 1801, but incorporates many of the ideas which Ritter encountered over the following years. Like his *Europa*, Ritter addresses the atlas to teachers and describes the work as one which fills a pedagogic need. Despite the scientific character of this work, Ritter makes a few important
pedagogic remarks that shed light on the gradual fusion of his pedagogic and scientific thinking.

The first remark concerns drawing and is framed by an apology for the atlas' limited physical size which was dictated by cost. He recommends that the teacher, or better still, the students themselves, make enlarged sketches of the maps. This was a procedure which was part of Ritter's own early education and pedagogic practice and was an exercise which promoted detailed and careful observation. Secondly, Ritter incorporated a mapping innovation that he explains was calculated to complement the psychological process of mental visualization. His "Relief Map of Europe," the first of his series of six maps, incorporates an inverted shading sequence where the shading becomes lighter with increasing elevation. In Ritter's time it was normal to do the reverse. Ritter argues that this method of shading enhances the mental imaging ability (Einbildungskraft) and makes the map more realistic:

Betrachtet man diese Blatt eine längere Zeit mit einiger Aufmerksamkeit, so hat man den Gewinn dass die Einbildungskraft von dem Papiere abzogen wird, und dass man nicht wie gewöhnlich auf dem Papiere nur die Landkarte, sondern das Land selbst zu sehen sich gewöhnt (Ritter, 1806b, preface).29

Whether this pedagogic observation by Ritter was made "ad hoc" or was the result of careful theoretical pedagogic thought and experimentation is another question. Ritter used such inverted shading on an earlier lost map of the mountain systems in Germany in 1802. But there, he adopted such shading so that he could more easily make written inscriptions: "...so daß ich überall mit schwarz einschreiben konnte..."—so that I can make entries in black throughout (Ritter to GutsMuths, Sept. 1, 1802; see Plewe, 1959, p. 132). Finally, Ritter acknowledges an important pedagogic deficiency and advises teachers that the ordering of the map series should "...anders seyn als sie wirklich ist"—be other than it actually is (Ritter, 1806b, preface).

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29 "If one looks at this page for a long time with some concentration, one will profit in that the process of mental imaging will abstract from the paper and one will become accustomed to seeing, not merely a land map on the paper, but rather the land itself."
He leaves it to the teacher's discretion to decide whether to alter the incorrect ordering in their teaching, but Ritter felt that there was a correct and more desirable way.

The preferred ordering was not arbitrary, but paralleled the chain of environmental causation which Ritter understood as explaining the occurrence of natural phenomena on the earth's surface including variation of human culture. It was the same causal chain that lay at the base of his materialist conception of the primacy of environmentally determined exchange relations in human society as discussed in the preface to his *Europa*. As a means of organizing his description of Europe, this causal chain might be understood as an early expression of the *Länderkundlichen Schemas*—regional geography model, as employed in regional studies and textbooks as late as the mid-twentieth century (Elkins, 1989, p. 24). Ritter's *Sechs Karten* was not conceived merely as a descriptive atlas, but as a way of explaining, perhaps only in a preliminary way, the spatial variation of nature in all its manifestations.

The work is restricted nominally to Europe, and the environmentally determined variations as observed in Europe, but the work has a general comparative character by virtue of theoretical remarks which Ritter illustrates with extra-European observations of travelling scientists. It is unfortunate, but not unexpected, that Ritter makes no remarks which address explicitly the comparative method, for his atlas was conceived as a practical aid to his *Europa* and theoretical discussion was out of place. His comments in GutsMuths' journal (1806) which he recommends to his readers in the atlas' preface are directed to such methodological consideration, but they confine attention to the scientific application of comparative logic, still somewhat inconclusively. If Ritter's *Sechs Karten* is analysed in accordance with his preferred sequencing of the subject matter, the line of environmental causation, the application of a comparative method, and his commitment to the principle of continuity in nature become apparent. In Ritter's mind, there was perhaps already a sense, that the structure of scientific causation was parallel to the proper sequencing of its instruction.

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30"The Mountain-Table should be at the beginning, the Height-Table should follow, then the distribution maps of Wild Trees and Shrubs, only then Domesticated Plants, then the Animals, and finally the Ethnic Tribes."
It was a short step for Ritter to adopt from Pestalozzi one year later the idea that the proper structuring of science must parallel the structure of the thought process of the mind.

The Mountain System

Like most diluvialists of the time, Ritter begins with the mountains, from which all else arises. Ritter’s diluvialist position is not surprising in view of his training in Halle and his personal acquaintance with the diluvialist geologists Ebel, Freiesleben, and Heim. Ritter was also familiar with the works by von Humboldt and von Buch who adopted this view. Diluvialism was the norm in Germany at this time. Ritter makes several remarks indicating the extent of his adoption of this thinking. For example, he writes that:

Hauptgebirge mit ihren Aesten und mancherley Zweigen widerstanden in den Revolutionen der Urwelt den Strömungen des Meeres und gaben den Ländern ihre Form. Alle hervorspringende Spitzen und Caps, sind Trümmern von Gebirgen, die noch den Wogen des Meeres ihr Ziel setzen (Ibid., p. 13).31

Ritter was apparently a non-uniformitarian in contrast to Goethe and others who believed that the earth’s development was gradual, uniform and continuous with no sudden dislocations—an idea at the root of their abhorrence of human political revolutions.

Ritter supports Bauche’s widely accepted theory that the mountain systems of the earth form an interconnected whole through suboceanic linkages. Ritter observes that remnants of the past, suggest that the present form of Europe is not the same as it was in earlier times. Great revolutions have changed its form and more specifically he notes that:

31"The primary mountains with their boughs and many branches withstood the currents of the sea during the revolutions of the ancient world and gave the lands their form. All the jutting peaks and summits are remnants of mountains which still make the target for the waves of the sea."
Länden, jetzt durch Meere getrennt, hingen ehemd zusammen. Dies zeigen die Gebirgsarten der Vorgebirge welche mit einander übereinstimmen und die Küsten der Meere (Ibid., p. 16).  

Among several examples given as proof, the most conclusive is the Giant's Causeway on the north coast of Ireland which runs continuously to the Isle of Staffa and then, as Ritter notes, on through the Hebrides and the Faroe Islands to Iceland and Greenland. He observes that: "...die Tiefe des Oceans bedeckt die verlorenen Glieder dieser Kette"—the depths of the oceans cover the lost links of this chain (Ibid., p. 16).

As a continuous interconnected global system or what Ritter called in 1804 the "skeletal" structure of the earth, the mountains constitute a natural means for its division. The division is of various orders of magnitude, that is of both inter- and intra-continental scope, but in all cases the division is linked to the role that mountains play in determining watershed boundaries. For example, Ritter writes of the Ural Mountains in Russia and the role they play in connection with the other mountain systems in Europe in determining the eastern boundary of Europe:

On an intra-continental scale, Ritter asserts that the mountain system divides Europe into three main watershed areas: (1) the northern which includes Scandinavia; (2) the southern which includes the Mediterranean lands; and (3) the mid-watersheds which separate the North and Baltic Seas from the Caspian and Black Seas. The British ranges and the Grampian Mountains in Scotland are according to Ritter isolated, but

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32"Lands which are now separated by seas were earlier interconnected. This is shown by the rock types of promontories which are consistent with one another and the coastlines of the seas."

33"These [the Urals] complete the mountain system of Europe and determine the boundary between two continents by their own natural borders. They extend from north to south more or less directly against the previously mentioned parallel running watersheds and connect themselves to the great central ridge of mountains in High-Asia."

156
nevertheless take on the same general character as the main system of the northern watershed.

After a general comparative survey of the mountains and associated geology, Ritter concludes that each of these three naturally determined watershed zones has its own geologic character. He then further generalizes the result by arguing that:

Diese Uebersicht bestätigt es, dass von den Gebirgen die Form des Landes abhängt, welche also wie wahres Bas-relief zu betrachten ist (Ibid., p. 16).3 4

Mountains are not merely the means for natural delineation, but are understood as the base from which the inscribed drainage basins develop their own individual characters. Primarily, Ritter has in mind their basic geology and surface morphology, but these in turn are the most important determinants of the vegetative structure, or what Ritter called the "Hauptfloren"-main floral regions.3 5

The Plant Kingdom
Ritter's discussion of plant distribution is divided into discussions of domesticated (cultivated) and undomesticated (wild) plants. The two categories are intermixed despite the separate discussions Ritter attempts. This probably reflects Ritter's recognition that the main factors governing the distribution of both groups are very similar. But Ritter is explicit in his wish to examine the distribution of wild plants first, presumably because they are less a product of artifice than a product of the transcendent laws of nature.

Wild plant distribution is explained primarily by soil distribution and soil types which possess varying degrees of receptivity for plants, both quantitatively and qualitatively. Ritter observes that mountain lands by virtue of their geology have more vegetation than the plains, and consequently argues that:

Die wilden Pflanzen verbreiten sich wahrscheinlich zuerst von den Hauptgebirgen aus, und nach diesen bildeten sich in Europa 5 Hauptfloren, die

34"This review confirms that the form of the land depends on the mountains, which are therefore to be considered as a true base-relief."

35Ritter uses the word "Regionen" and "Floren" interchangeably in his immediate preceding remarks.
These five naturally delineated vegetative zones or "Blumenfloren" include the: (1) Northern; (2) Helvetican; (3) Austrian; (4) Pyrenean; and (5) Apennine. He also notes that there were mixed zones which were characteristic of the flora of coastal areas.

Ritter’s concept of "mountain determined" vegetative regions is further modified by the inclusion of a "climate determined" element which is explained by explicit comparative observation. Ritter’s observation of the influence of climate on vegetative distribution has two interrelated components. The first is that as geographic latitude decreases, the quantity and variety of vegetation increases. The second is that as elevation increases, vegetation decreases. Ritter then observes the systematic connection between geographic latitude and elevation, i.e. relative temperatures. He does not argue this theoretically, but asserts it by empirical comparative observation. Ritter observes that vegetative zones which are found near sea-level in the northern latitudes are found at progressively higher elevations in the southern latitudes. This is derived from the work of Tournefort and confirmed by comparison based on scientific observations by world travellers—especially Alexander von Humboldt. Hence while the zone of no vegetation, or what Ritter calls the: "...ewige Eis- und Schnee Region"—eternal ice and snow region, is found at sea level north of the arctic circle at around 80° N latitude, he observes that a corresponding zone at the equator is found at an elevation of 14,600 feet (Ibid., p. 17). Likewise, in the northern watersheds of Europe, vegetation ceases at 3000 feet while in the southern watersheds it stops at 7000 feet. This is the main purpose of his table of comparative mountain heights which he says should precede the discussion of vegetative distribution. He delineates these and other vegetative zones in his series of mountain cross sections. He includes peaks from northern, middle and southern Europe as well as the peaks of Chimborazo at the equator in the Andes to illustrate fully the relationship.

Ritter does not offer a precise mathematical model, which such inductive comparative observation would seem to suggest. In fact, he asserts that a precise

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36"The wild plants possibly spread themselves out at first from the main mountain regions and successively five main floral regions evolved in Europe, each occupying a certain land mass and having their own particular species of plants..."
delineation of the borders of the ice region in mountains is not possible because in addition to latitude, the borders depend on too many other place-dependent variables such as aspect, slope, winds, mountain types, etc. (Ibid., p. 18). He observes further that the border between the vegetative and ice zones is not rigidly defined but is actually an imprecise fluctuating transition zone which he further characterizes as "...den Schauplatz des Krieges zwischen Winter und Sommer..."—the showplace of the war between winter and summer (Ibid., p. 17). Ritter writes quite revealingly:

Also lässt sich auch hier die Natur wie überall nicht in Grenzen einschliessen; doch befolgt sie unverrückt gewisse allgemeine Gesetze (Ibid., p. 17).37

This is a clear reference to the law of continuity in nature which Ritter employs explicitly in his detailed discussion of specific latitudinal and altitudinal biogeographic groupings.

In these biogeographical remarks, Ritter draws heavily on the well-known and respected scientific findings of Willdenow (botany) and Zimmerman (zoology). But his remarks concerning latitudinal effects on plants and animals bear such a close affinity with von Humboldt's *Ideen zu einer Physiognomik der Gewächse*—Ideas for a Physiognomy of Vegetation, 1806, that this work was probably the immediate source of this thinking. Ritter read this work a few months before the publication of the *Sechs Karten* in August 1806, for he cites the work in his journal article published in July. Like von Humboldt, Ritter argues that as latitude decreases, there is a continuous increase in the variety of life forms. Spitzbergen, for example, had only 30 types of wild plants, while further south Lappland had 534 types. This is followed by a progressive series: Sweden (1299); Brandenburg (2000); Piemontesischen (2800); Coromandel (4000); and Jamaica and Madagascar (5000) (Ibid., p. 1). Animal species varied in a similar way. Von Humboldt had generalized the phenomenon by noting that:

Wer demnach die Natur mit Einem Blick zu umfassen, und von Lokalphanomenen zu abstrahiren weiß, der sieht, wie mit Zunahme der belebenden Wärme, von den Polen zum Aequator hin, sich auch allmählig

37"Therefore here too as everywhere, nature cannot be enclosed in borders, but it continues to follow undisturbed certain general laws."
organische Kraft und Lebensfülle vermehren (v.Humboldt, 1806, re., 1959, p. 28). 38

Ritter echoes this in the Sechs Karten when he writes:

Das Reich der Gewächse ist von der Natur über die ganze Erde nach den eignen Gesetzen der Pflanzenwelt verbreitet...Mit der grössten Wärme nimmt die Anzahl der Gewächse und ihre innere Lebenskraft zu, oder die Vegetation wird grösser (Ritter, 1806b, p. 1). 39

This concept of continuous latitudinal variation in nature is also observed altitudinally—also the result of graduated levels of "enlivening warmth." Ritter observes a similar continuous change in vegetation both quantitatively and qualitatively in the ascent or descent of mountains and writes of an "abgemessenen Stufenfolge"—precise stepped-sequence. The sequence includes the mosses which grow at high altitudes and appear to depend only on water and light, and as one descends from these misty heights, one observes a definite series of plant—the Alprosa (rhododendron), then small shrub-like trees, then pine wood and finally deciduous forest.

Despite climatic influence in plant distribution, Ritter remains convinced that climate exerts a subordinate role to the influence of geology. Soil is the most important determinant for Ritter. In fact, he adopts the idea of a graduated scale of geological receptivity (Grad der Empfänglichkeit) for plant colonization. Lava and granite are the least receptive, gneiss is less unreceptive, micaceous schist is more receptive, and chalk or limestone is very receptive (Ibid., p. 5). Each material is also relatively more or less sensitive to individual plant species. Geology exercises therefore both quantitative and qualitative control. Continuity as a natural principle plays a very central role in Ritter's scientific thinking.

Less determined than the distribution of wild plants, is the distribution of domesticated plants. Ritter observes that in general nature has prescribed precise

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38 "Whoever knows to comprehend nature at a glance and to abstract from localized phenomena, sees how, with an increase in animating warmth from the poles to the equator, the organic force and the abundance of life gradually increases."

39 "The kingdom of plants is distributed by nature over the entire earth according to the laws of the plant world...With greater warmth the number of plants and their inner life-force increases, or the vegetation becomes larger."
borders, but notes that plants have invariably overstepped these borders and dispersed their seeds in a variety of ways:

...durch den Wind...durch das Umhertreiben der Flüsse und Bäche...durch die Strömungen des Meeres, das fast an allen Küsten fremdes Gesäme an den Strand wirft...vorzüglich aber durch die industriöse Hand des Menschen, der z.B. die schwächeren Getreidegattungen in so vielerlei Zonen, und auf jeden Boden verpflanzte--(Ibid., p. 1).

Ritter recognizes that human labour can overcome the limitations of soil so that the distribution of cultivated plants is a good indicator of climatic zones. In the absence of a comprehensive set of meteorological observations this is virtually the only method of climatic delineation. Ritter's mapping indicates correctly the northern limit of individual crop cultivation in Europe as dipping to the southeast, the result of the transition from a maritime climate in the west to a continental climate in the east. Human activity is understood by Ritter quite early in his thinking as an important element in environmental change, albeit subject to its general transcendent laws; and what is true of plant distribution is true also of animal distribution.

The Animal Kingdom

Animals are not as tightly linked to geologically determined vegetative regions. Even less tight is their link to geographic (i.e. latitudinal) climatic regions. But animals are bound to particular physical elements such as air, water and earth.

Jeder Thierklasse scheint vornemlich ein Element zum Aufenthalte angewiesen zu seyn; aber in allen sind einzelne Geschlechter, denen ein andres Element angewiesen ist (Ibid., p. 9).

Some species are bound to their element more than others, and Ritter recognizes amphibians as one of numerous groups that move between elements. But Ritter observes that if anything affects the animal economy, it is the influence of the physical

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40"...through the wind...through the wandering of rivers and streams...through the currents of the seas which bring foreign seeds to the beaches of almost all coasts...but above all through the industrious hand of man that plants for example the weak species of grain in so many various zones and in all soils."

41"Every animal class appears to be allotted one element as a home. But there are single families to which an additional element is allotted."
distribution of these three elements which determine what von Humboldt referred to as an "organisches Gewebe"—organic web, which "...lagert sich schichtenweise...auf das andere..."—positions itself on the other in layers (von Humboldt, 1806, re., 1959, p. 26). Animals are environmentally controlled by the vegetative or physical structure that supports them (Ibid., p. 25).

Ritter conceives the influence of geographic (latitudinal or climatic) position on the distribution of animals as acting in a different manner. He does not acknowledge an altitudinal continuous series of animal forms which would parallel the vegetative series, but he does clearly state that such a continuous series exists latitudinally both quantitatively and qualitatively:

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Der Einfluss des Clima auf die Thiere ist bekannt; wie bey den Planzen so nimmt auch hier gegen Süden die Mannichfaltigkeit der Formen zu, die Gattungen sind viel characteristischer von einander unterschieden, die Farben gehen aus braun, schwarz und weiss in die prachtvollsten brennendsten Farben über...(Ibid., p. 10).42
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He notes also that animal covering becomes progressively more refined proceeding from coarse bristles to silk hair, from thick fur to naked skin, and from gentle grass eating animals to the rapacious flesh eaters (Ibid., p. 10). Ritter ignores the northern provenance of polar bears and wolves.

But despite this environmental deterministic thinking, Ritter recognizes the greater freedom from geographic (i.e. climatic) control which animals have by virtue of their mobility—a concept which Blumenbach called Bewegungswerkzeuge—method of movement, and used in his own attempts at a logical zoological taxonomy (Schmidt, ADB 2: 750). Animals may have followed the same latitudinal pattern as plants, but the existence of a great number of migratory species is testament to the higher degree of independence which Ritter attributes to animals in general.

Of all animals, Ritter recognized man as indisputably the most independent, or as he observes:

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42"The influence of climate on animals is well-known. As with plants, so the plenitude of forms increases towards the south. The species have more characteristics to differentiate one from another, the colours go from brown, black and white over to the most magnificent fiery colours."
Kein Geschlecht der Thiere ist so ganz über alle Theile der Erde verbreitet als das des Menschen (Ritter, 1806b, p. 10).

As an independent being, man exerts considerable influence as an active agent of environmental change. According to Ritter, the existing pattern of vegetation and wildlife in Europe, owes its shape to the effects of human alteration of habitat by the increasing scale and intensity of cultivation. For example Ritter writes:

Manche Thiergattungen wurden durch die Cultur des Landes, nur auf gewisse Landstriche eingeschränkt, wie der Mousslon, die Gemse, der Biber, das Elenn, der Bär (Ibid., p. 10).

In his enumeration of wild animals, Ritter creates a separate category labelled: "Auf gewisse Erdstriche eingeschränkte Thiere"—animals limited to certain areas (Ibid., p. 12). But it is not clear that he is referring to animals whose habitat has been restricted specifically by man.

Despite the relative independence which Ritter assigns to man and animal, he appears to forsake this principle by writing that:

Jedes Thiergeschlecht hat sein Land, an das es gebunden zu seyn scheint; jedes Thier ist der Sohn der Erde, die es bewohnt (Ibid., p. 10).

Ritter includes humanity as one such "Geschlecht der Thiere"—family of animals, and like the animals, human groups reflect their natural habitat—a concept he repeats many times in his later writings (Kremer, 1981, pp. 130ff). Like other animals, human activities are not subordinated to blind dependence on natural forces. Instead as one ascends the environmental chain there is increasing autonomy, presumably by virtue of increasing flexibility of response inherent in an increasing mental ability. Mankind

43"No family of animals is so completely distributed over all parts of the earth as man."

44"Through land cultivation many animals species like the moose, the chamois, the beaver, the elk, the bear, became restricted to only certain land areas."

45"Every animal family has its land to which it appears bound. Every animal is the son of the earth which it inhabits."
may be physically characteristic of a nurturing environment, and its way of life may be
determined in large measure by environment, but mankind is not innately restricted to,
or merely the captive creature of one place. In 1806, Ritter was not a polygeneticist.
He makes this clear in his analysis of human groups.

The Human Kingdom
Ritter’s analysis of human distribution in Europe begins with the assertion that the
European race, is simply one among several races which collectively belongs to a
single species of man. He adopts Blumenbach’s division of man into five races and
observes that the European was primarily caucasian (with the exception of the Finns,
Lapps, Samoyeds, Tartars and Gypsies). Those features which are characteristic, or
distinguish the European race from others, were not the result of an independent
lineage, but rather the same environmental forces which brought about degeneration of
forms among all other organisms. He is quite specific, but recognizes too the
theoretical nature of the "single species" hypothesis. The European, he writes:

...können mit allen andern Erdbewohnern von einem gemeinschaftlichen Stamme
entsprungen seyn, haben aber doch durch Clima, Lebensart, u.s.w. eine
Veränderung in ihrem Körperbau erlitten, die von Geschlecht zu Geschlecht
forterbt, also charakteristisch ist (Ibid., p. 21).46

Ritter employs unequivocally the concept of environmental differentiation through
climate, diet, way of life, etc., which reflects the thinking of Blumenbach. But Ritter
distinguishes his position further in his recognition of the European as the standard of
comparison:

Sie sind weiss von Farbe, mit rothen Wangen, langem, weichen, braunen Haar
(das vom hellsten Blond in das dunkelste Braun übergeht); ihr Schedel und ihr
Gesicht hat die, bey den cultivirtsten Nationen, anerkennt schöne, musterhafte
Form (Ibid., p. 21).47

46"...could be evolved together with all other earth inhabitants from a common
tribe, but have undergone a change in their bodily structure through climate, way of
life, etc., which was transmitted from generation to generation and is hence
characteristic."

47"They are white in colour, with red cheeks, long, soft, brown hair (which goes
from the brightest blond to the darkest brown); their skull and face has that recognized
beautiful, model form of the cultivated nations."
This aesthetic model form is not derived from Blumenbach, but may be attributed to Sömmering's influence. Like Herder, Sömmering included an aesthetic element into racial classification. Herder argued in the *Ideen*, 1784, that the Asian race of temperate latitudes was the most idealistic (Nisbet, 1970, p. 230). But for Sömmering, like the German classicists who idealized the Greeks, the European race was the ideal. Ritter also associates beauty in the European race with a high level of cultivation. Like the thinking of Sömmering, the hierarchical implications are hard to ignore. But unlike the polygeneticists, Ritter promotes the view of a single species of mankind. He does not directly address the associated implication of ancient human migrations to explain existing distributions, but migration is a main criterion for his categorization of national groups in Europe (Figure 6.1).

Ritter divides European peoples into those who were indigenous and those who inmigrated. He avoids polygeneticism by defining indigenous people as those who were in possession of the land at the time historical records began. Ritter further divides groups according to the extent of their mixing with indigenous peoples. Some indigenous groups like the Spanish or the Italians were mixed with more recent immigrants, but others such as the Germans or the Finns remained unmixed with their original languages and customs. It is perhaps this latter category that was later used for racist purposes, although the Finns, the Goths, Slavs, Hungarians and Turks were also identified as unmixed, but of extra-European origin. As an auxiliary aid to *Europa*, it is surprising that Ritter does not use the *Sechs Karten* as a means for classifying the various folk-groups according to physical characteristics, diet, way of life, etc. For such a classification would have been consistent with Ritter's aim to show the mutual effects of people and their land and the line of environmental causation. The failure to do so is one of the valid criticisms made of his *Europa* (Bertuch, 1805, p. 315).

There are several interesting observations and conclusions that might be extracted from this work. Ritter had a distinct idea of what he wanted to achieve, but was not yet clear how to go about it. The theory of environmental determinism was clearly to play a key role, but Ritter's theoretical knowledge derived from the works of

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48 This aesthetic racial classification may have been adopted by Herder and therefore Sömmering from similar ideas of Winkelmann, whose works Ritter may have encountered in Halle, under August Wolf.
Figure 6-1
Ritter's Classification of Nationalities

Source: "Sechs Karten von Europa," 1806
Blumenbach, Ebel and Sömmering and the model study which Heeren’s work provided, did not find practical expression. The *Sechs Karten* acknowledges and employs a comparative method and the method is related, but not identical, to the model employed by von Humboldt and the Freiburg geologists. Ritter does not use the comparative model himself to derive *empirically* general principles, or to refine models through iterative refinement. Instead, he uses the comparative observations of travelling scientists to verify ideas which he has adopted from the literature, particularly from the works of Zimmerman and Willdenow.

The principle of continuity in nature also finds expression throughout the *Sechs Karten*, but in the absence of a discussion of typological theory and ideal forms, it cannot be said yet that Ritter subscribes to an idealized version of the chain of being. Ritter adopts folk-groups as fundamental units in his geographic analysis, but he does not abstract these into idealized units (Urvölker) as he does in 1808. His lack of such thinking at this time is noteworthy in view of its prevalence in much contemporary scientific work and his familiarity with von Humboldt’s physiognomic ideas. Blumenbach may have cautioned Ritter about such thinking as it related to applications of a "metaphysical" chain. A comprehensive system of related thinking lurks very close to the surface of Ritter’s *Sechs Karten* as well as his *Europa*, but unfortunately it remains unelaborated by Ritter. This may be due to a characteristic reticence by Ritter who considered himself a pedagogue and was reluctant to publish statements of a purely scientific nature. But if his pedagogic remarks of this same period are examined in detail a comprehensive view of science and method is attributable to Ritter and his pre-Pestalozzi position is revealed. This provides a basis for appreciating the decisive changes in outlook and the adoption of a quite specific scientific ideology which followed Ritter’s visit to Yverdon in September 1807.

Ritter’s "Einige Bemerkungen über den Unterricht in der Geographie,"—Some Remarks Concerning the Method of Instruction in Geography, 1806

In late Spring and early Summer 1806, despite unease in European politics, Ritter found sufficient peace in insular Frankfurt to write his "Bemerkungen"—Remarks. The article consists of twenty pages and was written as a critique of a pedagogic article by a fellow educator Herr Linder about the proper methods of geographic instruction. Linder’s article appeared in GutsMuths’ journal in April 1806 and Ritter’s critique appeared three months later in the July issue. Despite criticisms aimed specifically at
the limited scope of Linder’s geography, Ritter used the article as a vehicle to promote his own view of geographic instruction as inspired by reflection on his own education, his experiences in Frankfurt, his interest in geography, and his desire to contribute to pedagogic development.

His great interest in appropriate teaching methodologies for public education which was stimulated by Hufnagel’s reform efforts and is expressed in 1805 by his wish to have the opportunity to study carefully a "teaching school" so as to form his own principled opinions about the best methods of instruction (Ritter, 1805 in Kramer, 1875, p. 96). Despite the travels and visits Ritter made in 1800 to some educational institutes in the company of Horstig and Zerrenner, Ritter’s first real study visit did not occur until the period immediately subsequent to the writing of this article. In addition to his visit to Jacobson’s school in Seesen and his pedagogic meetings in Braunschweig in the company of Zerrenner, Ritter also visited Pestalozzi’s school in Yverdon in the following year. Ritter’s "Bemerkungen," provide a means to distinguish Ritter’s early concept of geography and knowledge from the concepts which emerge after his pedagogic meetings of late 1806 and 1807.

Linder’s article interested Ritter because geography was understood by Ritter as essential to education and was also the main focus of his scientific interest. Ritter’s understanding of the natural system of instruction which included geography, and his attempt to adapt it to the urban context of Frankfurt, gave him the experience and confidence to confront Linder. His writing style is less-assuming than his preface to Europa, but he writes with assurance and supports his pedagogic arguments by invoking effectively the authority of Kant and Pestalozzi. Ritter’s biographer Kramer suggests that this article is the first occasion where Ritter applies Pestalozzi’s principles to the handling of geography (Kramer, 1875, p. 171). This may be partly true, but Ritter’s restricted view of geography and his yet limited knowledge of Pestalozzi prevents his employment of the full theoretical framework of Pestalozzi’s system. In Summer 1806, Ritter’s geography was not yet an independent science and not yet fully comparative.

The Main Argument
Ritter raises many theoretical issues concerning the sources and process of knowledge, the organization of science, and the practice of geography. He discusses the role and
position of geography among the sciences and the proper procedures and sequence of
geographic instruction. But Ritter’s main argument and point of departure is that the
pedagogue Linder held an overly restricted view of geography. Ritter agrees with
Linder that there is almost no science which does not use geography, but he disagrees
with Linder’s definition of geography as a *rein-*pure science, which consists in:

...uns den Raum in seinen verschiedenen Abtheilungen zu benennen, uns in
demselben zu fixiren, und die Richtungen und Verhältnisse deselben zu einander
klar und anschaulich darzustellen (Linder as quoted in Ritter, 1806a, p. 199).49

Ritter argues that geography cannot be treated as a pure science because it is an
historical science, and like the historical sciences it deals exclusively with the objects
of experience (Figure 6.2).

Geographie gehört zu den historischen Wissenschaften, (im weiten Sinne) und
umfaßt nebst Naturbeschreibung, die Unterabtheilung derselben, welche man
beschreibende Wissenschaft, im Gegensatz der erzählenden nennt, zu welcher die
Geschichte (im engern Sinne) gehört (Ibid., p. 199).50

Geography may share the field of knowledge with the rational sciences, and the
rational sciences may have a proper place in instruction, but like the historical
sciences, geography is an empirical descriptive science and has its own unique
methods. While analytical rational science requires memorization of rules and ordered
systems of facts, the empirical descriptive sciences proceed synthetically providing
information upon which theory can be founded, or as Ritter himself asserts:

Die razionalen W. [Wissenschaften] führen uns von der Theorie zur Erfahrung:
die historischen von der Erfahrung zur Theorie (Ritter, 1806a, p. 200).51

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49"...to name space in its different sections, to orient ourselves in the same, and to
present clearly and vividly to ourselves their directions and relations to one another."

50"Geography belongs to the historical sciences (in the wider sense) and embraces
in addition to Nature Description, the subdivisions of the same, which one calls the
describing sciences as opposed to the sciences to which history (in the
narrow sense) belongs."

51"The rational sciences lead us from theory to experience: the historical, from
experience to theory."
Figure 6.2
Ritter's Schemata of Sciences

Based on: Ritter, 1806a.
Ritter supports his argument by summoning the authority of ancient Greece. He notes that the experience-based historical sciences existed long before the pure sciences were created by Euclid and Socrates. He explains that Herodotus already produced his "masterwork" without the help of theory by presenting historical facts as they presented themselves to him. Ritter argues philologically that the original Greek etymological meaning of geography as derived from his reading of Anaximander and Hekataeus suggests that geography was conceived as the description of the inhabited earth, i.e. the oekumen (Ibid., p. 201). Despite his theoretical language, Ritter's geography is idiographic in the same sense as Herodotus' geography. For Ritter the essence of geography, like the historical sciences, consists in the fact:

...daß sie sich auf einzelne, in der Erfahrung vorkommende Gegenstände bezieht, und nicht auf Gegenstände, die nach allgemein Begriffen gedacht, subordinirt und durch allgemeine Grundsätze erkannt oder konstruiert werden können (Ibid., p. 199).  

Despite Ritter's assertion that the historical sciences lead from experience to theory, in 1806 theory and abstract concepts have no place in Ritter's geography.

Geography as an Auxiliary Science
The empirical material which geography assembled and compiled was understood by Ritter as essential for the development of other sciences. Like Linder, he observes that:

...es fast keine Wissenschaft giebt, von der man nicht Bruchstücke in die Geographie übertrüge. In sie werden Mathematik, Naturgeschichte, Technologie, Geschichte, Statistik, Menschen- und Völkerkunde u.s.w. mit eingeflochten, deren Verbindung freylich oft genug ein sehr buntfarbiges Ganze geben mág (Ibid., p. 199).

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52...that they relate themselves to individual, empirically occurring subjects, and not to subjects which are conceived in accordance with general concepts, subordinated and can be known or constructed through general principles."

53...there is almost no science from which one does not transfer a bridgepiece to geography. In geography are interlaced mathematics, natural history, technology, history, statistics, human and ethnic science, etc., and their interconnection may fairly often produce a very brightly coloured whole."
Despite the intimation of a role for geography as an integrative science, geography is restricted by Ritter to the provision of empirical material for further development by other sciences. Ritter's attempt in *Europa* to create a greater unity in the presentation of geographic facts was calculated to provide an effective means for integration of these facts into other sciences. This view may have been derived from Blumenbach and Ebel, but it was also based on a sophisticated understanding of the theoretical processes of knowledge.

In the closing section of the "Bemerkungen," Ritter elaborates his understanding of the rational and empirical sciences by distinguishing the mental processes which accompany them. He writes that the application of the mind in the rational sciences consists in abstracting (Abstrahiren) or in the ordering of the simple (Absondern des Einfachen). On the other hand, the descriptive (beschreibenden) and enumerative (erzählenden) sciences consist in the "Auffassen des Mannichfaltigen"--apprehension of the plenitude. The rational sciences embrace reason (Raisonnement) and insight (Einsicht), while the descriptive and neutral sciences embrace representation (Darstellung) and cognition (Anschauung). Both mental processes and sciences were necessary to proper mental development, but the latter, of which geography was a part, were restricted to synthesis of sensual information--the first step of Kant's process of knowledge (Ritter, 1806a, pp. 216-17).

According to Kant, knowledge is acquired by three fundamental human faculties which are mutually necessary and hierarchically linked (Figure 6.3). These faculties include: (1) apprehension (Auffassungsvermögen); (2) ordering/abstraction (Absonderungsvermögen); and (3) reflection (Ueberlegungsvermögen). The hierarchical linkage of these steps is acknowledged by Ritter himself who writes that the faculty of apprehension, or what he describes as internal receptivity (Receptivität), is just as necessary to reflection as the logical faculty of abstraction. Apprehension generates synthetically the material for logical analytical reflection. The synthetic and analytic operation of the mind are not mutually exclusive parallel processes of knowledge, but they are integrated steps in a single process that brings together logic and experience. In her commentary on Kant's *Anthropologie*, which was the immediate source of Ritter's understanding of Kant in 1806, Mary Gregor rightly observes that for Kant "...synthesis is the condition of analysis..." or as Paton puts it "...it is synthesis which
Figure 6.3
Kant's Theory of Knowledge

Based on: Kant, 1787, 1799.
gives something to be analyzed" (Gregor, 1974, p. 196). Like Kant, Ritter’s geography was a synthetic foundation for analytical science.

As a synthetic foundation, Ritter’s geography could not embrace the comparative process which was a logical element of Kant’s system. Ritter understood this distinction not only from his study of Kant’s Anthropologie, 1798, but also from his study of Kant’s Critik, 1787 under Jakob in Halle. His class notes from Halle reveal that ordering (Absonderung) and abstraction (Abstraction) were derived from comparison (Vergleichung) which Ritter understood as a logical process (logische Bildung d. Begriffe) (Ritter, 1796, p. 4; see above Figure 4.1). Ritter’s quotation of Kant in the "Bemerkungen" is also revealing because of an important omission (Ritter, 1806a, p. 217). The work which Ritter cites is unmistakably the 1799 edition of Kant’s Anthropologie which was published in Leipzig and Frankfurt. On page 22 of this edition, Kant describes his theory of knowledge.

Man sieht wohl, daß, wenn das Vermögen der Erkenntniß überhaupt Verstand heißen soll, dieser das Auffassungsvermögen (attentio) gegebner Vorstellungen, um Anschauung, das Absonderungsvermögen, dessen, was mehreren gemein ist, (abstractio) um Begriff, und das Ueberlegungsvermögen, (reflexio) um Erkenntniß des Gegenstandes hervorzubringen, enthalten müsse (Kant, 1799, p. 22 [emphasis added]).

Ritter’s quotation of this statement omits the words: "...was mehreren gemein ist..."—what is common to many, which qualifies the meaning of Kant’s second step of knowledge by linking explicitly it to the process of comparison, i.e. the comparison of objects to abstract common elements which form conceptual categories. This was an oversight by Ritter or the editor, but aptly illustrates that without Kant’s comparative step, empirical knowledge remains merely an assemblage of facts. Without abstract concepts, knowledge is only a composition of material facts, i.e. idiographic knowledge. As a principle for the practice of geography, this is a clear departure from, but no great break with, the encyclopedic approach of Ritter’s immediate geographic forebears.

54“One sees well that if the capacity for knowledge is generally to be called understanding, this would have to contain the capacity for; apprehension (attentio) of given ideas in order to bring forth intuition; the capacity for abstraction of what is common to several (abstractio) in order to bring forth concept; and the capacity for reflection (reflexio) in order to bring forth knowledge of the subject."
The Structure of Geography and Geographic Instruction

Ritter divides geography into three main subareas: mathematical, topical and descriptive (Figure 6.4). These categories parallel his pedagogic sequence of instruction which is divided into three parts (Figure 6.5). But the pedagogic system goes further into what is described as Völkerkunde—ethnic science. Like his scientific division of geography, Ritter's pedagogic sequence has an hierarchical arrangement which resembles the Länderkundliche Schema which he employs in the Sechs Karten. The first course Natürliche Erdbeschreibung—natural earth-description is understood as a necessary foundation for a second course in Politische Erdkunde—political earth science. This in turn forms a foundation for a third and final course in Völkerkunde—which Ritter conceives as an extension of human science Menschenkunde (Ibid., p. 214).

Ritter's first course begins with pure geography, i.e. geometrical exercises, descriptive astronomy, mapping and topical geography which he describes as nomenclature or the naming of places. The first course seeks to orient the student to the position of the globe in the solar system and to give the student a sense of scale in differentiating places on the Earth. This latter aim is achieved in accordance with the natural method which promotes the use and drawing of large-scale maps of the surrounding countryside. Ritter writes of these maps that:

> Dieß wäre wohl nothwendig, um einigermaßen einen Vergleichungspunct für die Größenverhältnisse zu erhalten: denn Deutlichkeit und Bestimmtheit hierüber wird doch nur am Ende derjenige erlangen, welcher durch größere Reisen Entfernungen beurtheilen lernt (Ritter, 1806a, p. 208).55

These exercises are presented by Ritter as aids to descriptive geography but certainly not ends in themselves as Linder asserted. Ritter observes that geography "...ist aber darum nicht allein die Wissenschaft der räumlichen Verhältnisse..."—is however, not simply the science of spatial relationships (Ritter, 1806a, p. 201). To further distinguish Ritter's system of geographic instruction from Linder's, it is sufficient to

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55"This would be very necessary in order to receive in some measure a point of comparison for the relationships of size. For distinctness and determinedness of this is certainly in the end only acquired through judgement learned from trips of great distance."
Figure 6.4
Ritter's Structure of Geography

Based on: Carl Ritter, 1806a.
I. FIRST COURSE
Natural Earth Description

MATHEMATICAL GEOGRAPHY
Projection & Measures
Natural Divisions

NATURAL HISTORY
Biogeography
Natural Systems

II. SECOND COURSE
Pol. Earth Science
(Politische Erdbünde)

TECHNOLOGY
Production Science
Business, Craft, etc.

POSITIVE GEOGRAPHY
Kingdoms, natural & artificial boundaries

CONSTITUTIONS
Treaties, Alliances
Legal System

PHYSICAL QUALITIES
Soil, Climate, Farming
Cities, Pop., Strength

III. THIRD COURSE
Ethnic Science
(Völkerkunde)

NATIONAL CHARACTER
Physique, Temperament
Way of Life, Tradition

HISTORICAL RELATIONS
Ancestry, Diffusion
Mixing, Distribution

CULTURAL RELATIONSHIPS
Governed or Governing
Language

Based on: Carl Ritter, 1806a.
observe that Ritter's first course in geography is accompanied by teaching in natural history.

Natural Division of the Earth

Ritter's first course includes a study of the natural partitioning of the earth. Linder's use of a "rationally derived" mathematical partitioning was unsatisfactory. Like other taxonomic systems, it was criticized by Ritter as flawed by virtue of its artificial and arbitrary nature. Instead of an "[a]us Rechtecken bestehendes mathematisches Netz,"--rectangular mathematical grid, Ritter seeks to orient the earth's surface:

...nach den natürlichen Abtheilungen, welche sie uns selbst darbietet...welches von der Erde selbst das bestimmte Bild in der Seele hervorbringt (Ritter, 1806a, p. 209).56

The division of the Earth into natural holistic units forms the crux of Ritter's elementary instruction by virtue of its role in creating unified mental images. In this first course, the divisions of the earth are shown to have been determined in the first instance by the oceans. At this level of aggregation, the earth divides itself into fixed land and islands. Further subdivisions of the land conform to watershed boundaries, which are determined by mountain chains. River districts of various scales were fundamental units of land division. Ritter writes:

So ist die ganze Erdoberfläche nach ihren eignen Gesetzen auf das Genaueste in physicalische Erdtheile, Gebiete und Districte eingetheilt (Ritter, 1806a, p. 210).57

These divisions form the basis for the remaining courses of Ritter's geography or what he calls on different occasions politische Geographie--political geography, bürgerliche Erdbeschreibung--civil earth description, or simply Erdkunde--earth science (Ibid., p. 204). Observation of discrepancies between political boundaries and natural boundaries is an important exercise in Ritter's second course. But he observes too that the same laws of natural division influence the natural characteristics of areas,

56"...according to natural divisions which it [the earth] presents to us itself...which brings forth from the earth itself the determinate picture in the mind."

57"So is the entire earth’s surface according to its own laws divided in the most precise way into physical continents, areas and districts."
and the understanding of these characteristics is an important element in his second course.

...derselben Einfluß zeigt sich nun auch auf die Bewohner dieser natürlichen Ländergebiete: denn sie leben unter gleichen Einfluß des Climas, haben gleiche Nahrungsmittel; bey ihnen entwickelt sich auf ähnliche Art Gewerbe, Landeskultur, Schifffahrt; selbst in Character und in ihren Culterverhältnissen werden sie mehr oder weniger Gemeinsames haben, was vom Locale abhängt (Ritter, 1806a, pp. 210-11).\(^5\)\(^8\)

The study of these national characteristics is the subject of his final course or ethnic science.

Ritter argues that in tracing these physical and cultural features according to the inner laws of their occurrence, and not according to an arbitrary system of relative location, a simplified and scientifically ordered study of geography results (Ibid., p. 211). This is the view he promotes in his *Sechs Karten* which was developed to accompany instruction as a graphic presentation of natural surface distributions reflecting these same underlying inner laws of demarcation. Ritter concludes his argument for a scientifically ordered system of geographic instruction on a pedagogic note.

\(^5\)^8 "For these same laws of delimitation affect the characteristic peculiarities of climate, rock types, soil texture, and therefore also the mineralogical products, the plant world and the animal world of each area and its districts in ceaseless continuity."

\(^5\)^9 "...the same influence reveals itself now also in the occupants of these natural land areas (Ländergebiete): For they live under the same influence of climate, they have the same diet, similar types of trade, land cultivation, navigation; even in character and in their social organization they will have more or less in common that which depends on locality."
Ritter does not seek an interconnected unity of abstract conceptual knowledge, but rather a unified holistic combination of idiographic knowledge. Discrete facts have been combined into a larger biogeographic holistic assemblage rather than refined into a general abstract model.

This organic whole is conceived idiographically and as a natural system—a discrete ecological man-land unit which stands in coterminous relation to its naturally defined borders. This may be an expression of Blumenbach's concept Totalhabitus, but Ritter does not use it to derive a natural system of taxonomy.

Despite the lack of a theoretical model of geography in conformity with other sciences of the time, Ritter's holistic ecological unit is of fundamental importance. Ritter emphasises the importance of this concept when he writes that the goal of his second course Politische Erdkunde should be to bring the student to the philosophical viewpoint that "...nicht das Land an den Staat, sondern der Staat an das Land gebunden ist—the land is not bound to the state, but the state is bound to the land (Ibid., p. 213). Clearly the state is conceived by Ritter as a naturally determined physico-cultural unit. This may owe less to Herder's concept of nation than it does to the physiological thinking of Blumenbach, Sömmering, Ebel and Heeren, but Herder's influence also embraced the thinking of these scientists. There is also much which might be attributed to Rousseau.

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60 "If now the earth's surface is known in its particularities according to this viewpoint, so the results can be united and brought under a general viewpoint by the student himself."

61 "If now the general results concerning the circumstances of countries are united, so this also occurs with the natural bodies which are summarized by a natural system as well and thereby united into a whole."

180
In 1806, Ritter’s concept of geography has not developed much beyond the idea expressed in 1804, but the interlinkage of geography and natural history has greater prominence as is evidenced both by his "Bemerkungen" and the *Sechs Karten*. Likewise his knowledge of science and the comparative method is greater, but Ritter does not yet see the possibility of applying the method to geography, despite a sophisticated knowledge of the logical processes of thought. Instead he is content to perfect Sprengel’s work by bringing a greater synthetic unity to geographic knowledge so as to facilitate its use by the logical sciences. He makes no attempt to create an abstract conceptual structure for geography, because geography is strictly a *descriptive* science whose chief task is effective presentation of facts.

The fleeting remarks Ritter makes about the use of the comparative method in the *Europa* and the *Sechs Karten* are equivocal. On the one hand, his mention of "gegenseitigen Vergleichungen"—mutual comparisons in 1804, is reminiscent of Heim’s use of comparison as a means of understanding the laws of interconnection within dissected wholes—a process which is linked to creating a greater level of synthetic unity. On the other hand, the model of comparison which Ritter acknowledges explicitly in 1806 is derived from von Humboldt and the Freiburg School. The Freiburg model employed an iterative comparative method which generated abstract forms and theories. In 1806, Ritter may not have understood completely this practical distinction although the pedagogic writer Basedow made a similar distinction forty years earlier (Basedow, 1764, §38; see above page 48). Ritter’s revelation that this latter model could be applied also to geography came one year later in 1807. This revelation is accompanied not only by an increasing integration of natural history and geography, but also by Ritter’s adoption of a non-Kantian idealistic theory of knowledge. Unlike Kant, Ritter is prepared to accept teachings that postulate the existence of innate ideas and ideal forms. The foundation for this thinking was established in Halle, but Ritter’s first application of this idea is a direct outgrowth of his meeting with Pestalozzi in 1807. But despite these discernable concrete influences, the independent development of Ritter’s own self-actuated mind cannot be dismissed easily, nor can the effects of his increasingly balanced interchanges with other independent thinkers.
In the period 1806-1812, Ritter’s task of teaching the Bethmann-Hollweg and Sömmerring children became progressively more demanding. His private study remained centred on pedagogic questions while he continued to read in science and the classics. The human suffering which accompanied the political subjugation of Germany also deepened Ritter’s interest in public education or the *Volksaufklärung*—enlightenment of the people, as a means to alleviate these miseries. Like his Frankfurt colleagues, Ritter was moved by events and his own theoretical questioning to visit Pestalozzi in Yverdon in order to evaluate the effectiveness of Pestalozzi’s methods. Ritter found more than he expected and left Yverdon with ideas both for a new system of geographic instruction and with a new view of geography. But Ritter’s efforts were still directed primarily toward pedagogic problems. Upon his return to Frankfurt in 1807, Ritter met Alexander von Humboldt who was passing through Frankfurt en route to Paris. Von Humboldt confirmed the most important elements in Ritter’s new concept of geographic science and Ritter dedicated the next few years of his life not only to the preparation of his students for university training, but also the preparation of a manuscript (now lost) which applied Pestalozzi’s system to Ritter’s own expanded view of geography. This was the transitional intellectual step that led to the expression of his new concept of scientific geography in the introduction of the *Erdkunde*. This new concept was researched and written in Göttingen in the period 1812-1815 and will be discussed in Chapter VIII. But in 1806, shortly before the outbreak of war between France and Prussia, Ritter made an important trip which opened his eyes to the pedagogic genius of his stepfather Heinrich Zerrenner and to Zerrenner’s efforts to alleviate the distress of German village life. It was his last formal pedagogic experience before the revelations of his Pestalozzi trip in 1807.

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"In cognition lies the original archetype of everything..."
Zerrenner and the Pedagogic Excursion of 1806

In August 1806, Ritter travelled around the western edge of the Harz from Duderstadt to Braunschweig via Goslar and Seesen to visit new innovative schools and to meet practising pedagogues. Ritter's biographer Kramer says little about the trip except that Ritter also visited Schnepfenthal and his home town, and that he was accompanied by his stepfather Zerrenner (Kramer, 1875, pp. 100-1). Detailed information is provided in an article written by Ritter and published in Zerrenner's journal *Neuere deutsche Schulfreund*—New German Schoolfriend, in early 1807 and includes his pedagogic evaluation of the schools he visited. The article is written informally as a diary and includes many remarks of praise for his stepfather whom he recognizes as great pedagogic thinker.

Ritter met several important schoolmen in Goslar, Seesen and Braunschweig and examined their theories by examining how they were implemented in their schools. It is to be lamented greatly that Ritter's impressions of the famous pedagogic writer J.H. Campe in Braunschweig were not recorded in this published work. For in the company of Zerrenner and Campe, both of whom were known as theorists, Ritter may have witnessed a discussion of the latest theories, including their assessment of Pestalozzi's work. Like Campe, Zerrenner was acquainted personally with Basedow and shared similar theoretical views. The most important point that emerges from Ritter's article, is that for the first time, Ritter learned intimately the pedagogic thinking of Zerrenner through discussions lasting for several days. Ritter's article recounts his revelation of the amazing amount of knowledge that his stepfather possessed. For as Ritter writes:

> Ich erkenne in ihrem Kreise auch Sokrates, Comenius, Rousseau, Basedow, Rochow, Lieberkühn, Hoogen....hier sind die einzigen Priester mit dem Orakel das--allein zum Tempel führt (Ritter, 1807, p. 25).²

This remark was made to describe Zerrenner's address to the school in Seesen founded by Israel Jacobson in 1801. He gave a reading of Alcibiades' testimonial to Socrates which brought his audience to tears and Ritter described as among the

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²"I recognize in his circle also Socrates, Comenius, Rousseau, Basedow, Rochow, Lieberkühn, Hoogen....here are the only priests with the oracle that alone leads to the temple."
happiest hours of his life (Ibid., p. 24). The reading was followed by a socratic lesson for the children explaining how to concentrate their innate sensual abilities in order to learn from experience, instruction and contemplation (Ibid., p. 25). Zerrenner spoke also to the students about law and order in both the human and natural worlds and explained that God governs both:


He explains that if students wish to have knowledge of God's wisdom, they must practise learning through concentration (aufmerken) and contemplation (nachdenken):

...dann lernen wir die Ordnung, die Gesetze in der Natur und in unserer Vernunft, und so die Weisheit Gottes und ihn selbst immer besser kennen (Ibid., pp. 26-7).⁴

These remarks made an important and lasting impression on Ritter who grasped immediately the theoretical and practical implications of such parallel ordering of nature and mind. His critique of the Seesen school included the observation that its methods were not properly ordered because the school failed to distinguish between elementary and advanced instruction. The programme was not harmoniously balanced. Language and grammar should not be part of elementary instruction, but rather natural history and geography that prepare the student's sensual and mental faculties. Ritter proceeds one step closer to his integration of science and pedagogy when he writes:

³"You should« when reason prevails. »You must« when it does not. Psalm 32,9. So exists order. In us it is our conscience that gives laws, outside of us in nature there is order. It also has its laws, namely natural laws. Psalms 148,6. Laws emerge from thought, they originate from a thinking entity, therefore there is rational ordering in nature, wisdom in nature arises from a lawgiver. This lawgiver is God."

⁴"...then we learn to know better the order, the laws in nature and in our reason and so the wisdom of God, and even God himself."
This implicit reference to the chain of being may have been among the "trefflichen Ideen"—excellent ideas, which were discussed by Ritter and Zerrenner as they left Seesen by carriage on their way through the Hildesheim area to Braunschweig (Ibid., p. 33). For Zerrenner adopted the chain of being in his own conception of nature (Zerrenner, 1792, pt. 2, p. 427). Ritter records that their discussion included Zerrenner's knowledge of von Rochow who was an important proponent of public education for the "Landvolk"—country people, whose afflictions resulted from deficient education. National renewal was not yet a strong motivating force in Ritter's life. He had not yet experienced first hand the suffering which accompanied Napoleon's arrival in south Germany. But the alleviation of the distressing circumstances of German village life was an important concern of pietist circles and one which Ritter shared.

Heinrich Gottlieb Zerrenner (1750 - 1811)

Zerrenner was born in Wernigerode on the northern edge of the Harz about 12 km ENE of Brocken. His father was a domestic servant and the young Zerrenner received his earliest education from court catechists who employed the notorious methods of intimidation and punishment (Jacobs, *ADB* 45: 96). In 1759, he entered the Lateinische Oberschule in Wernigerode where he received a good education. The subconrector Christian Meier emphasized physical exercise, learning by observation and collection. He stimulated students further by organizing hikes to Brocken and Baumannshöhle and by free discussion (Ibid., p. 96). Zerrenner also received private instruction in modern languages. In 1764 he began four years of study at the Pädagogium at Kloster Berge where he came to reject the prevailing "fear-based religion" (ängstliche Religiosität) which was practised by his parents and the ecclesiastic authorities of Wernigerode who followed the pietistic temperament of Spener and Franke. Zerrenner's rejection of this religious disposition motivated his later efforts to rid the scripture of theologically unsound human appendages.

In 1768, by means of a small inheritance, Zerrenner entered Halle University to study theology. He lodged with the son-in-law of Professor Nösselt, had access to

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5"Not only in the method, but even in knowledge and the sciences too, a stepped-sequence (Stufenfolge) should be observed."
Nösselt's library and joined a group of young scientific theologians who collectively reviewed, criticized and debated the literature. At his behest, his roommates rose early and studied together, especially Greek. Zerrenner also heard lectures from Semler and Förster, studied mathematics under Segner, history with Pauli and literary history with Klotz. He studied Hebrew intensively and gave private lectures on several books of the Bible. Upon completion of his formal studies in Halle in 1771, Zerrenner had little desire to return to Wemigerode where his rationalistic views would be unwelcome. He remained in Halle where he studied Musaen’s *Gewissensfrage*, Melanchthon’s *loci und examen ordinandorum*, and the symbolic books of the Bible. He worked almost exclusively with Plessing and Steithorst, while his good friend Semler sought to find him support in Halle. It was Nösselt who found him a teaching position at Kloster Berge in Magdeburg where Zerrenner had great success teaching Latin, mathematics and experimental physics under the supervision of Rector Frommann and Klosterprediger Reccard. In 1775 Zerrenner received a call as preacher (Prediger) to Beiendorf at Dodendorf. In addition to preaching, he handled agricultural affairs. This responsibility brought him into close contact with the problems of farming communities and the understanding and education of these communities became his life’s work.

**Bible, Nature and Farmers: Zerrenner’s Folk-Theology**

Zerrenner’s intimate knowledge of the character, perceptions and needs of farmers was derived from his pastoral duties especially his Sunday visitations. In 1778, while recuperating from a broken arm, Zerrenner began to collect his knowledge by writing sermons and books of instruction for country people. This culminated in his *Volkbuch*, 1787, which earned him recognition as a "volksthümlich theologischer Schriftsteller"—folk theologic writer. His *Schulbibel*, 1799, which was used by Ritter in his lessons in Frankfurt, was also successful and reflected his special interest in religious instruction and educational reform. He promoted reform by his editorship of *Der deutsche Schulfreund*—The German Schoolfriend, 1791-1811, which was founded specifically for the exchange of information and practical ideas among preachers who oversaw education in the German Volks- and Dorfschule. It was not designed for use by scholars and Latin Schools (Zerrenner, 1791, re., 1794, pp. 1-18). Zerrenner’s interest in education came to the fore after his instalment in 1788 as Königlichen Inspector and Oberprediger at Derenburg which brought with it responsibility for the education system. Shortly before his death in 1811 he was appointed...
According to Zerrenner, the *Volksbuch* was meant to be read aloud by families during periods of idleness. It was written ostensibly as a story about a typical farming community, but it contains physiographic descriptions of the land, a cultural summary of the people, and a fascinating array of teachings about the actual operation of a farming community, the roles of its citizens, its government, its clergy, the schools, the economy, etc. It offered practical information about health, personal relationships and might be understood also as an extended diatribe against superstition including, among other things, a definitive statement that witches do not travel to Brocken to dance on Walpurgis Night (Zerrenner, 1792, p. 291). Zerrenner understood superstition as one of the main obstacles to proper education and the alleviation of the apparent miseries of country people.

This view was elaborated earlier by Zerrenner's associate, the nobleman Friedrich Eberhard von Rochow in his *Versuch eines Schulbuches für Kinder der Landleute oder zum Gebrauche in Dorfschulen*—Attempt at a School Book for the Children of Country People or for the Use of Village Schools, 1772, the preface of which contains an apt summary of his programme of reform. The book was an expression of von Rochow's despair at the outbreak of disease in one of his estates and the farmers' reluctance to listen to his advice or a doctor's advice and to rely instead on their own superstitions and folk remedies (Binder, *ADB* 28: 729). Accordingly, Zerrenner's *Volksbuch*, had sections on medicine and natural history that employed practical farm husbandry terminology and sought to dispel superstitions associated with astronomical events, eclipses, comets, the northern lights, thunder, lighting, etc. Zerrenner strove to boost the morale of country people by ennobling their role as a backbone of the state. He shared von Rochow's view that agriculture was an essential component of the state: "In Ackerbau die Grundkraft des Staates liegt"—in agriculture lies the foundation of state power (Rochow, 1772 as quoted by Binder, *ADB* 28: 731).

An important nationalist element in the educational reform work of von Rochow and Zerrenner is expressed not only as a desire to raise standards of living, but also in a conservative desire to strengthen the existing order. Despite Rochow's efforts and
successes at educational reform of the Prussian Volksschule system, he was still criticized by the social revolutionary Pestalozzi for his conservative character—a shared by Ritter’s familial circle, i.e. Zerrenner, Salzmann, and GutsMuths all of whom were trained as theologians and had a commitment to educational reform within the existing social structure of the state. The nationalism that arose in Germany in the following years was not so much a social revolution as a fear of the subversion and destruction of the German national character by submission to a foreign (i.e. French) system of institutions. Ritter’s nationalist sympathies lay in this direction.

Zerrenner and Basedow

There is little question that Zerrenner contributed to Ritter’s understanding of pedagogic theory, especially those ideas derived from Basedow and his school in Dessau. Zerrenner was part of Basedow’s personal circle as was Rochow⁶ who played a role in gaining support for the Pedagogium in Dessau (Binder, ADB 28: 732). They shared a sensualist perspective that Zerrenner praises when he writes of Basedow that:

Er war es, der besonders die sogenannte Versinnlichungsmethode beim Kinderunterrichte zuerst wieder einführte und gemein machte, die Salzmann und Wolke nach ihm mehr ausbildeten, Commentii Orbis pictus gab ihm den Stotz dazu. Durch Bilder und instructive Figuren, Kindern anschauliche Begriffe von sinnlichen Gegenständen, und dadurch Lust und Freude am Lernen beizubringen, ist das Wesentliche derselben (Zerrenner, 1794-5, v. 3, pp. 50-1).⁷

In this commemoration, Zerrenner cites Basedow’s theoretical work Philalethie which Zerrenner describes as a good example of the extent of Basedow’s intellect (Zerrenner, 1794-5, v. 2, p. 61). Through Zerrenner, Ritter may have acquired a fresh view of the concept of continuity in the process of knowledge. For in Philalethie Basedow discusses distinctness and clarity as consisting of degrees and his concept of classification in natural sciences is derived from the chain of being or what he calls "...das Gesetz von der Stetigkeit..."—the law of continuity (Basedow, 1765, II, §59; I,

⁶See Zerrenner’s memorial to Basedow, 1791-2; and von Rochow, 1805 in Der deutsche Schulfreund re., 1794-5; and 1805.

⁷"It was he, who reintroduced and popularized the so-called sensual method of child instruction, which Salzmann and Wolke developed further. Comenius’ Orbis pictus provided the foundation. The essential aspect of this method is to teach children vivid concepts of sensual objects through pictures and figures and thus teach them to enjoy learning."

188
§117; see above discussion in Chapter II). In his Volksbuch, Zerrenner observes this same principle:


This same hierarchical principle as applied to instruction is acknowledged explicitly by Zerrenner who writes that instruction should be zweckmäßig—functional, and quotes Herder’s Briefe zur Beförderung der Humanität:

"...daß alles schrittweise gehe, und man so, ohne Sprung, sicher, obgleich langsam, von Stufe zu Stufe zu immer größerer Vollkommenheit fortschreite" (Zerrenner, 1799, p. vii).9

Zerrenner was not strictly a physicotheologian. He argues in his Kurzer Unterricht in der christlichen Religion nach der Bibel—Abbreviated Instruction in Christian Religion in Accordance with the Bible, 1790, that if we consider the objects of God’s creation with careful attention (Aufmerksamkeit) we can sense God’s existence, but despite his concern about human appendages to the Bible, he suggests that the Bible is still the easiest way to learn about God (Zerrenner, 1790, p. 10).

Ritter gained much from Zerrenner who encouraged Ritter in his pedagogic pursuits. Zerrenner is reputed not to have differentiated between his natural children and his stepchildren (Jacobs, ADB 45: 99) and Ritter remained in close contact with Zerrenner after his mother’s death in 1800 as is evidenced by their correspondence. The hardships which Zerrenner experienced when French administration was imposed on his community was taken very much to heart by Ritter who wrote to his stepfather that he should take comfort in the writings of Fichte, Jean Paul, Schleiermacher and Villers (Ritter, 1808, in Kramer, 1875, p. 122). Ritter’s attitude to Volksaufklärung was stimulated a great deal by his familiarity with Zerrenner’s experience in the

8 "For dear friends, in God’s nature there are no leaps. Everything advances from the less worthy to the worthy like a ladder full of rungs."

9 "...that everything proceeds step-wise, and one advances without leaps, slowly but surely, from step to step, to ever greater perfection."
villages. But by late 1806, the effects of Napoleon’s invasion of Prussia induced Ritter to consider the state of humanity as a whole.

Frankfurt and the Political Eradication of Germany

Shortly after Ritter’s return to Frankfurt-am-Main in the late summer of 1806, the effects of Napoleon’s advance through Germany made itself frightfully evident. Many seriously injured and completely dispirited German prisoners of war arrived in Frankfurt. With great anxiety Ritter went to the Main to help the wounded disembark from the ships and as Ritter writes: "...in jedem suchte ich ein bekanntes Gesicht"--in each I looked for a familiar face (Ritter, 1806, in Kramer, 1875, p. 101). This experience was deeply disturbing to Ritter who after reflection attributed the suffering to the destructive nature of mankind and the weakness of its leaders.

Der Mensch ist tief zu bedauern, der die Sünden seiner Väter tragen, der Bürger, der für die Fehler seiner Oben büßen muß (Ibid., pp. 101-2).10

Especially appalling to Ritter was the reported cowardice of the military leaders who abandoned their troops in Jena.

Kein Held steht an der Spitze der Mannschaften, nur völlig characterlose Schemen, welche die Würde des Menschen nicht kennen und wie Feige für Recht und Pflicht nicht zu sterben wissen...(Ibid., p. 102).11

Despite the apparitions of a war which was hopelessly lost, life in Frankfurt maintained a certain continuity. The Rheinbundakte of July 12 brought Frankfurt peacefully under Napoleonic control through the enlightened intermediary Prince Karl von Dalberg who was warmly greeted as a patron of the arts and sciences. Dalberg who shared the same philanthropic views as Ernst II of Gotha, gave considerable support to educational reform in Frankfurt (Stricker, 1874, pp. 4-5). In late 1806, Frankfurt received visits from royalty including the Empress Josephine and the Queen of Holland. The entire city transformed itself and the old French etiquette was re-

10 "Mankind which bears the sins of its fathers is much to be lamented as is the citizen who must atone for the mistakes of his superiors."

11 "No hero stands at the head of the troops, only completely characterless silhouettes which know not the value of men and or how to die for justice and duty."
instituted for the visit. Ritter writes that to an impartial observer the whole masquerade was very instructive. He was amazed how quickly Frankfurt’s rich civic spirit (Reichsbürgersinn) transformed itself to find new worthiness in nobility. Ritter writes that the civic spirit was leaking from the walls of Frankfurt and that he could see that this spirit was not a product of character, but the result of circumstances (Verhältnisse). He lamented that in the new order the idleness of nobility would replace the honourable industrious civic spirit (Ritter, 1806, in Kramer, 1875, p. 103).

Despite these changes and events, Ritter continued his usual routine of teaching in the Hollweg house. He gave lectures on Sunday nights at a girls’ school, and the following summer he accompanied his students to private lessons in Greek that were given by Grotesend. He also took an uncharacteristic interest in the unfolding of public affairs which culminated in the Peace of Tilsit. Although his daily life was not profoundly affected by these affairs, he lamented the political eradication of Germany, especially Prussia which he considered his homeland. He was deeply disturbed by the silencing of leaders of intellectual culture and national education by the threat of the sword.

Thränen der innigsten, bittersten Wehmuth pressen sich aus meinen Augen bei dem Anblick der leidenden Menschheit, bei dem Anblick des Landes, an das sich durch meine Geburt, durch liebende Seelen und durch die Ideenwelt so innig geknüpft war! (Ritter, 1807 in Kramer, p. 106).12

It was in this frame of mind that Ritter prepared himself for a trip to Switzerland to see the Alps and to visit the spiritual leader of popular education Johann Heinrich Pestalozzi.

Switzerland and the Pestalozzi Institute in Yverdon (September 1807)
In the summer of 1807, Ritter began preparations for a long anticipated journey through the Alps. The planned trip would take Frau Bethmann-Hollweg, her children and Ritter to northern Italy and back via many of the natural provinces of Switzerland including the Waadtland where Yverdon and the Pestalozzi Institute were located. Ritter charted a carefully considered course with the aid of a relief map of

12"Tears of the deepest, bitter melancholy fall from my eyes at the sight of human suffering and the sight of the land to which I am attached by birth, by living beings, and by the intellectual world."
Switzerland, which Hollweg had acquired from Geneva, and with the aid of Ebel’s travel guides and scientific treatises. Ritter was provided with letters of introduction by Ebel who was greatly admired throughout Switzerland. Ritter had reason to look forward to an interesting and enlightening trip not only because of the cultural treasures he would see in the museums of northern Italy, or the sublime beauty he would experience in the Alps, but also because of the people of eminence and wit whom he would encounter. He was especially excited at the prospect of aesthetic contemplation of nature at a scale which only the Alps could offer.

As an educator, Ritter appreciated how his students would benefit from such an experience and he writes that his own excitement is stimulated more by the knowledge of how the experience would benefit his students, than how it would elevate his own spirit.

...ich hoffe, daß sie das Innerste ihrer Seele durchdringen, sie stimmen soll für das Erhabene und Schöne in der äußern Schöpfung, und mit Liebe und Andacht ihr Gemüth erwärmend sie entflammen soll für das Wahre und Gute (Ritter, August 1807, in Kramer, p. 107).13

Ritter’s travel diaries reveal that their experiences in Switzerland benefited greatly both teacher and students (see diary entries in Plewe, 1959, pp. 137-38).

For example, Ritter visited the waterfalls on the Rhine at Schaffhausen on three occasions during a one-day stay—once in the afternoon, once in the evening and once in the morning. The romantic reveries he records in his diary incorporate diluvialist imagery as well as references to the mythological legends of antiquity—the Irish hero Ossian as well as Wodan the ancient Scandinavian god (Ritter, 1807, in Plewe, 1959, pp. 137-38). He also writes in objective contemplation of his ascent of Rigi-Culm.

Ich steige höher auf dem Rigi-Culm und erblicke da den ungeheuren, piramidalischen Schatten schweben über dem Tal von Arth. Wie ein großmächtiger Riese hat er sich gelagert über diese Welt der Zerstörung...Allmählich senkt sich die Sonne, alles wurde röter, die Alpen glühten, herrlich--die Nebel selbst wurden immer röter, die Umrisse bestimmter,

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13"...I hope that it [sublime nature] will penetrate the innermost of their souls. It should produce in them an interest for the sublime and beautiful in the external creation and should inflame their spirit with love and devotion for the true and good."
The trip gave him the chance not only to revel in his own imagination, but also the opportunity to sharpen his skills of observation.

Ritter was excited also because he would visit the Pestalozzi Institute in Yverdon which was the model for educational planning and experimentation in Frankfurt. The institute was the focus of interest and debate about educational reform at the national level and had already played host to numerous interested pedagogues and government ministers from many parts of Europe. Like these other visitors, Ritter had his own pedagogic agenda. He would examine the living conditions of the students, their nourishment and the suitability of their clothes. He would observe the extent of physical training and the opportunity for hiking and instructive field trips into the surrounding countryside. He would also examine how geographic and natural historical instruction were integrated into the system. In short, Ritter would inspect Pestalozzi's implementation of the natural method of instruction which had been pioneered by Salzmann in Schnepfenthal. For Ritter, the Salzmann model was still an unrivalled standard of comparison. Ritter probably also had a secret hope that Pestalozzi and his collaborators knew his article about geographic instruction and had adopted its ideas into their geographic instruction. But after a careful examination of the writings of Pestalozzi and Niederer, Ritter wondered how Pestalozzi's concept of *Anschauung* was understood and applied, and whether his celebrated instructional system of *number, form and word*, was as simple and as powerful as it was reported to be. In 1807, Ritter still thought as an educator, despite his growing knowledge and interest in science. When he left Frankfurt on August 9, he could have had only an inkling that through Yverdon the scope of his outlook and the sphere of his effectiveness were to expand so greatly that pedagogic theory was ultimately to become only a structure through which a much larger scientific undertaking would take shape.

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"I climb higher on the Rigi-Culm and see the awesome, pyramidal shadows floating over the valley of Arth. Like an almighty giant it lays itself down upon this world of ruin....Gradually the sun sets, everything becomes redder, the Alps glow, beautiful--the mist itself becomes ever more red, the outlines more definite, the rock layers of the Nagelfluh ever more distinct, everything easy to distinguish."
Garden Conversation at Yverdon

When Ritter arrived at the Pestalozzi Institute on the shores of Lake Neu Châtel in Yverdon on Saturday morning September 19, 1807, he found Pestalozzi among his students. After observing morning instruction, Ritter had his first private conversation with Pestalozzi whose physical appearance reflected aptly the celebrated trials of his life. Ritter describes his face as wrinkled (gefurcht) by experience and the world. He was frail to his fingertips. He walked around with a handkerchief wiping his head and mouth. He took Ritter by the arm and led him to the garden (Ritter, 1807 in Plewe, 1959, p. 138). The fragments of the garden-conversation which Ritter records suggest that the exchange was one among many introspective contemplative soliloquies for which Pestalozzi is remembered.

Mit Liebe sagt er: Den letzten Tag, wenn Ihr hier seid, sagt auch, was wir machen sollen. Wir wissen nicht die Bücher, die Wissenschaft die wir brauchen. Saget uns! In der Anschauung liegt das Ururbild von allem, in der Klaue der Katze die Klaue des Tigers, in dem Kohlblatt die Kohlarten alle. Wieviel Ururformen sind in den Bäumen, wieviel in den Sträuchern, in den Blüten, den Tieren etc. Saget uns,--es macht nichts, wenn es Jahre dauert.... (Pestalozzi as cited by Ritter, Ibid., p. 138).15

Ritter was absorbed completely by this discourse and grasped immediately that Pestalozzi’s concept of Anschauung was the pivot of his method and was founded in a depth of consciousness of which Ritter had little familiarity.

Anschauung and Pestalozzi’s Psychological Instruction

For Pestalozzi, Anschauung was the core concept around which his method was constructed. By Anschauung, Pestalozzi sought to designate the existence of ideal a priori forms which condition the process of human cognition. Anschauung was also used by Pestalozzi to designate the cognitive process itself. Experience was reducible to a few innate essential forms or what he refers to as Urformen. It is through these Urformen that all objects are cognized and organized by intellectual operations into concepts (Pestalozzi, 1801, pp. 158-59). As Spinoza commented some 130 years

15“With kindness he says: the last day that you are here, tell us also what we should do. We know not the books, the science that we need. Tell us! In cognition [i.e. cognitive forms] lies the archetypical image of everything, in the cat’s claw, the claw of the tiger, in the cabbage leaf, all cabbage types. How many archetypical forms are in the trees, how many in the shrubs, in the blossoms, the animals, etc. Tell us,—it doesn’t matter if it takes years...."
earlier, the world presents itself to the mind mutilated, confused and without order (Spinoza, 1677, *Ethics* II, Prop. 40, schol. 2). For Pestalozzi in 1801, the world presented itself to the mind as an: "...ineinander fliessendes Meer verwirrter Anschauungen"--interflowing sea of confused cognitions (Pestalozzi, 1801, p. 159). The object of instruction was to lift this confusion by reducing these cognitions to their essential forms, ordering them into classes or categories, and recombining them to form distinct concepts. The object of instruction was not to be understood merely as a mechanically appended ensemble of facts achieved by the process of rote memorization, which characterized much of the educational methods of the time, but rather the object was to teach students to recognize the innate archetypical forms within themselves and to recognize these forms as they are expressed in nature, or as Ritter himself echoed "...daß der Mensch nicht außer sich findet, was er nicht von sich selbst anschaut"--that man will not find outside himself that which he has not cognized within (Ritter, 1808a, p. 24). This is what Pestalozzi describes respectively as the teaching of *Selbst-Anschauung*--Self-Cognition, which necessarily precedes the teaching of *Welt-Anschauung*--World-Cognition, and this is how Ritter understood the partitions of Pestalozzi’s system of instruction (see Figure 7.1).

Later that week in an evening conversation at the home of J.G. Tobler and in the company of his Frankfurt friends Mieg and Engelmann, Ritter noted that Engelmann felt that the method suppressed individuality by its failure to recognize the uniqueness of individuals. In Frankfurt, the Goethe family for one opposed the concept of mass-education for just such a reason. But a pietistic concept of individuality arose from this conversation, perhaps from Niederer who was a theologian and the theorist of the group. For as Ritter records, the method does not stifle individuality because:

...sie gibt keine positive, nur eine notwendige Form, die sich in jedem Menschen individuell seiner Natur gemäß entfalten muß, indem er nur die Bedingung der allgemeinen Form in sich aufgenommen hat (Ritter, 1807 in Plewe, 1959, p. 140).\(^{16}\)

\(^{16}\) "...it does not give a positive, but rather only an essential form which must unfold itself in each man, in accordance with his individual nature. He is only conditioned by the general form."
Figure 7.1
Ritter's Interpretation of Pestalozzi

PESTALOZZI SYSTEM

PART I
Self-intuition
Internal Awareness

Spiritual
Geumathswelt, Religion
(Hypothetical System)

Self-Discipline
Submission to natural
laws. Limiting needs.

Love
Domestic relations.
Love of parents.

Belief
Child's innate trust
of parents (humanity).

Intellectual
Geisteswelt
(System Implemented)

Number
Basic Unit: Unity (1)
i.e. counting by units

Form
Basic Unit: Point
Euclidean Logic

Word
Basic Unit: Sound
Speech and Song

PART II
World-intuition
External awareness

Sensual
Sinnenwelt
(Partly implemented)

Nature
Elements of Nat. Hist.
All natural kingdoms.

Empirical "I" (ego)
Human Ability, Morals
Wants/Needs/Possession

Society
Civil & World History
(Exchange relations?)

Based on Ritter, 1808a
Pestalozzi was justified therefore in describing his system as an: "...allgemeine und psychologische Unterrichtsmethode"--general and psychological method of instruction (Pestalozzi, 1801, p. 148). It was general because it was applicable to all races and social classes, and it was psychological because it sought to educate by addressing directly the internal processes of human cognition and contemplation, or what Ritter describes as the human Erkenntniskräfte--powers of knowledge (Ritter, 1808b, p. 114).

In contrast to traditional mechanistic approaches to education, this latter approach was understood by Pestalozzi as a natural organic process. Human knowledge was derived by internal necessity propelled by the natural human striving for intellectual development. Ritter observed, perhaps somewhat rhetorically, that the method was so completely self-propelled, that a teacher was superfluous once the process had begun (Ritter, 1808b, p. 114). Pestalozzi’s new general psychological method was a masterful stroke in its time. As Arthur Stein remarked, Pestalozzi spontaneously amalgamated Kant’s a priori thinking with the Leibnizian system of developing Kräfte-forces (Stein, 1945, p. 188). To use a Leibnizian term, individual human beings for Pestalozzi were individual monads.

A formal statement of Pestalozzi’s theory and method was publicized in his Wie Gertrud ihre Kinder lehrt—How Gertrud Teaches Her Children, 1801. The book has neither a table of contents nor descriptive section headings and is written as a collection of letters to the publisher Heinrich Geßner. But the book is arranged systematically and includes a short section devoted to a simplified discussion of theory (Pestalozzi, 1801, pp. 148ff). Pestalozzi begins by observing that the general psychological method of instruction is grounded in the laws of nature (Naturgesetze).

Die erste dieser Quellen ist die Natur selber, vermöge welcher sich unser Geist von dunklen Anschauungen zu deutlichen Begriffen emporschwingt (Ibid., p. 148).17

This shows without any doubt the influence of Leibnizian psychology. As Arthur Stein points out, this is a gradual process derived from the principle of continuity (Stein, 1945, p. 177). Like many other pedagogues, Pestalozzi observed a Stufenfolge--stepped-sequence, not only in nature, but also in the mind. Indeed nature

17"The first of these sources is nature itself which enables our mind to raise itself from obscure intuitions to distinct concepts."
and mind were merely two contrasting expressions of the same absolute identity, or
two contrasted currents which flow from the same Urkraft--primitive force. A concept
which owes much to Fichte's Identitatsphilosophie (Bobeth, 1913, p. 52). This
idealistic philosophy may have been explained to Ritter by Niederer after a teachers'
seminar when the so-called "absolute form of the objective" was discussed (Ritter,
1807 in Plewe, 1959, p. 139).

Pestalozzi also describes his understanding of the mechanics of knowledge. The
process includes the juxtaposition of objects (Zusammenstellen von Gegenständen) so
as to reveal their essence (Wesen) by eliminating those incidental qualities
(Nebensache) which are related to the circumstances of occurrence (Pestalozzi, 1801, p.
150). Pestalozzi refers explicitly to a Vergleichungsvermögen--faculty of comparison,
which he describes as a Dazwischenkunst--an intermediate art, which makes known to
us those qualities of things which are not immediately apparent to the five senses.
This process of intermediate cognition is achieved in conjunction with the other
intermediate faculties of Einbildungskraft--power of forming mental images, and
Abstraktionsvermögen--faculty of abstraction (Ibid., p. 191). Pestalozzi writes that the
confused state in which we receive cognitions is clarified by instruction when:

...sie [the art of instruction]...die Gegenstände unter sich sondere, die ähnlichen
und zusammengehörigen in ihrer Vorstellung wieder vereinige, sie alle uns
dadurch klar mache, und nach vollendeter Klarheit derselben, in uns zu
deutlichem Begriffe erhebe (Ibid., p. 160).18

These theoretical terms and the processes they denote were familiar to Ritter
who acquired this knowledge from a variety of sources including Salzmann in
Schnepfenthal, Jakob and Eberhard in Halle, Kant's Anthropologie, as well as from his
extensive independent reading of pedagogic theory. If Pestalozzi is less forthcoming in
his description of process, it mattered little to Ritter or anyone who had a basic
knowledge of the process. The language and meaning were recognizable instantly.
Niederer remarked that he had never met anyone who learned the Pestalozzi system as
rapidly and accurately as Ritter (Ritter, 1807 as transcribed in Plewe, 1959, p. 141).
This is perhaps evidence of Ritter's thorough reading of pedagogic theory in general.

18"...[the method] sorts objects among themselves, unites the similar and those which
belong together thereby making them all clear to us, and in accordance with complete
clarity of the same, enables us to form distinct concepts of them."
When Ritter acknowledges this formal system, he speaks of it in passing as common intellectual property and not specific to Niederer or Pestalozzi. Ritter describes their attempt to produce a formula (Constructionsformeln) for the spiritual processes which give rise to consciousness and intellect, as paralleling the formula which already existed for the faculties of knowledge (Erkenntniskräfte) themselves (Ritter, 1808b, p. 131). For Ritter, a second revelation was his realization that this hypothetical spiritual formula was understood by Pestalozzi and his collaborators as a new if incomplete philosophical basis of science.

Origins of Pestalozzi's Ideas
The origins of Pestalozzi’s ideas have been traced by many Pestalozzi experts who find in Pestalozzi echoes not only of Leibniz and Wolff, but also Comenius, Locke, Rousseau, Herder, Kant and others. In addition to Leibniz-Wolffian influences on Pestalozzi, Stein traces the relationship of Pestalozzi with Kantian thinking and concludes that Kant’s influence is related more to moral philosophy as mediated by Fichte, than with theories of knowledge. Leibniz, Kant and Fichte all shared similar views of the foundation of knowledge and Stein observes quite rightly that this reflects the common ground which all German philosophers of this period shared (Stein, 1945, p. 174). Despite the similarity of many passages in Wie Gertrud ihre Kinder lehrt with Kant’s writings, Stein argues that one must not attribute too much to the influence of critical philosophy (Stein, 1945, p. 188; compare also Stein, 1927). The great service of Stein’s article lies not only in its theoretical linkage of Pestalozzian and Leibnizian theory, but also in its exploration of how these ideas were transmitted concretely to Pestalozzi.

Pestalozzi’s first Leibnizian encounter occurred in 1763 at the Collegium Carolinum in Zürich which hosted a prominent group of academics including J.J. Breitinger and J.J. Bodmer and the scientists Steinbrüchel and Johann Geßner all of whom worked under the direct influence of the Leibniz-Wolffian Philosophy. Bodmer was Pestalozzi’s favourite teacher and once described Wolff as "den großen Lehrer Teutschlands"—Germany’s great teacher (Stein, 1945, pp. 128, 175-76). Pestalozzi was also a member of academic societies such as the "Gesellschaft auf dem Bach" and the "Helvetische Gesellschaft zur Gerwe" the latter of which was led by Bodmer and in

19 Stein also mentions Lavater, Zimmermann, Shaftesbury and F.H. Jacobi (Stein, 1945, p. 127).
1765 was stimulated greatly by the publication of Leibniz's *Nouveaux Essais sur l'entendement humain*—New Essays Concerning Human Understanding. Stein observes that the Zürich weekly journal *Wochentliche Anzeigen*—Weekly Journal, from this period contains a thorough discussion of this work and reflects a renewed interest in Leibniz that accompanied its publication (Ibid., p. 131). Forty years later, in the early nineteenth century, Niederer described Pestalozzi as a follower of the Baumgarten-Wolffian philosophy (Ibid., pp. 129-130).

Pestalozzi also studied natural science in Zürich. His teacher J. Geßner was among many who advanced the natural system of Charles Bonnet, a biologist in Geneva, and promoted the chain of being as a hierarchy of internal Kräfte—forces (Ibid., p. 178 citing Fueter, 1941, pp. 136, 144, 188ff; Nisbet, 1970, p. 38). Pestalozzi was also a close associate of J.C. Lavater who translated Bonnet’s *Contemplation de la nature*, 1764, into German. Like others, Lavater considered this book as his foundation and several experts suggest that Lavater’s *Physiognomische Fragmente*, 1775-1778, was an important source of Herder’s early knowledge of the chain (Stein, 1945, p. 178; Nisbet, 1970, p. 40). Pestalozzi’s natural system of instruction is derived not merely from Leibnizian psychology, but also from a Leibnizian inspired concept of nature. The philosophical elements of his system were therefore rooted in an interlinked holistic concept of man and nature.

**Application of the Pestalozzi Method to Science**

Niederer and Pestalozzi himself both believed that the Pestalozzi Method promised a way of placing the sciences on a firmer foundation. They adopted the thought of Fichte, who saw the need to establish a stronger basis for the sciences and for Kantian philosophy (Braun, 1972, re., 1981, pp. 4ff). Fichte argued that consciousness and experience as the two sources of knowledge did not provide sufficiently deep foundations on which to build a system of science. Instead both arose out of a deeper ground which lay within the structure of thought itself. An understanding of this primal ground, was understood by Fichte as the science of science, or even the science of the possibility of science (Fichte, 1794, §2, re., 1981, pp. 38ff). The obscure reasoning employed by Fichte need not be entered into here: it is sufficient to say that Fichte rejected the criticisms of Kant by Sceptics and Dogmatists alike who according to Fichte understood Kant’s "Dinge-in-sich" not as an ideal, but as a real object independent from consciousness (Braun, 1972, re., 1981, p. 17). Fichte gave great
impetus to idealistic interpretations of Kant including Schelling's which was elaborated and popularized by Hegel. This idealism found expression in a deeper level of consciousness that Pestalozzi understood as an ideal substratum of cognitive forms (i.e. "Urformen"). The ideal relationship of these ideal forms comprised the essence of the sciences.

Pestalozzi was first exposed to Fichte's idealism in Zürich in 1793 while Fichte was preparing his Über den Begriff der Wissenschaftslehre--Concerning the Concept of Scientific Systems, 1794. Pestalozzi was in close contact with Fichte who shared his interest in pedagogy (Braun, 1972, re., 1981, p. 6). Niederer also shared Pestalozzi's interest in Fichte's philosophy and was the force behind its incorporation into Pestalozzi's system. Niederer was the philosopher in Yverdon and corresponded with Schelling who followed his progress with great interest. In 1810, Schelling wrote to Niederer to ask whether Pestalozzi's system actually could be applied as a foundation for science, and observed that if this were true, it would constitute an intellectual revolution (Bobeth, 1913, p. 28). In 1812, this may have been the substance of Schelling's discussion with Ritter in Munich. But during Ritter's visit to Yverdon in 1807, there was already a belief among Pestalozzi's collaborators that they were creating not only a foolproof system of instruction, but also a new foundation for science. At the very least, they believed that the system of instruction shared the same foundation as science by virtue of the transcendental forms which comprised its base or what Pestalozzi's Method had reduced to the idealistic cognitive categories of number, form and word.

Ritter discussed these ideas in great detail with Niederer and Tobler who explained that science like instruction should not be founded on definitions, but must be founded in nature and derived synthetically. Ritter recorded this discussion in his travel diary and notes that knowledge does not begin with definitions:

...sondern mit dem in der Natur rein Gegebenen, mit Anfangsgründen aller Anschauungen und ihren Fortsetzungen, die völlig zum Bewußtsein, lückenlos und bestimmt, gekommen sein müssen nach ihrer Benennung, Form, Zahl, Verkettung, welche Zusammenstellen und Absonderung zu allgemeinen und allgemeinsten Gesichtspunkten führten... (Ritter, 1807 in Plewe, 1959, p. 139).²⁰

²⁰"...but with that which is given purely in nature, with the mainsprings of all cognitions and their extensions. These must come determinedly and without discontinuity to complete consciousness in accordance with their nomenclature, form, number and linkage, which comparison and ordering leads to ever more general aspects."
His remarks also describe what he calls the pure operation of the method for constructing science (Konstruktion der Wissenschaft). It consists of three steps which Ritter records as:

Das Lernen des einzelnen[,] erste Stufe. Das Vergleichen des Vorhandenen aus allen Standpunkten, zweite Stufe. Dies ist die Treppe, die zur dritten führt, zu dem allgemein Gesonderten nach allen möglichen Bedingungen, oder das Resultat des Ganzen... (Ibid., p. 140).21

For Ritter, the Pestalozzi Method was not merely a system of instruction, but also a system of science inductively deriving the unconditioned ideal forms upon which it was based. Ritter's adoption of these ideas is even more sharply outlined in his "Second Letter" that addresses specifically the application of the Pestalozzi Method to geography.

Application of the Pestalozzi Method to Geography

Ritter's understanding of the application of the Pestalozzi Method to science instruction arose from both theoretical discussion and careful observation of Tobler's and Hopf's lessons in geography and natural history. In the company of Niederer, Mieg and Engelmann, Ritter visited Tobler to discuss his system of geographic instruction. They had much to discuss from their own experiences and little on which to differ by virtue of their shared commitment to the natural method which emphasised the instructional role of the student's immediate surrounding physical environment. As Ritter describes it:

So wie die Elementarbildungsmittel in nichts anderm, als in dem bestehen, was das Kind selbst ist, was es an sich hat, ist und kann, eben so, scheint es, müssen in dem Gesichtskreis, der den Menschen umgibt, alle Mittel zu seinem nothwendigen Unterricht liegen (Ritter, 1808c, p. 196).22

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21"The learning of the single, first step. The comparison of nearby objects from all standpoints, second step. This is the staircase that leads to the third [step], to that which is generally ordered in accordance with all possible conditions; or the result of the whole."

22"Just as the elementary means of education consist in nothing other than in what the child is himself (i.e. what he has in himself, what he is and what he his capable of), just so it appears, that in the visual horizon which surrounds man lie all the necessary means for his instruction."
The surrounding landscape or visual horizon is the Urbild—essential image, through which the student acquires cognition of the entire earth (Ibid., p. 196). Pestalozzi's Bericht an die Eltern—Report to Parents, 1807, describes this approach as applied in all areas of instruction including geography and natural history. Like Ritter's early education under Salzmann and GutsMuths in Schnepfenthal, the students in Yverdon made numerous field trips. In Schnepfenthal this meant repeated observation of the Thüringer Wald, but in Yverdon this meant repeated observation of the neighbouring Buron Valley (Deutsch, 1893, p. 11). All the pedagogues, including Ritter's friends from Frankfurt, probably agreed that it mattered little where the actual visual horizon was found, because the same Urbilder or Urformen could be found in all.

Ritter's diary entries suggest that his discussion with Tobler centred on a manuscript prepared by Tobler which detailed his method of instruction. The manuscript was never completed or published. Despite its shortcomings, the manuscript, developed in isolation from the pedagogic literature of the time, was described by Ritter as a substantial if incomplete treatment of geography. Ritter described it as a legitimate attempt to found geography as an independent science (Ritter, 1808c, p. 198). Tobler had no previous knowledge of Ritter's 1806 article, but was receptive to Ritter's criticisms and recognized that the task of producing a definitive system was larger than either of them had originally thought. Ritter makes a plea for a general public effort to elaborate the work begun at Yverdon by Tobler and remarks that the task would be worthy of a life's work (Ritter, 1808c, pp. 202-3).

The details of Tobler's system and the subtle ways in which it differed from Ritter's own 1806 conception of geographic instruction need not be investigated in depth (see Deutsch, 1893). There is similarity between Ritter's natürliche Erdbeschreibung—natural earth description, and what Tobler called rein physische Geographie—pure physical geography. Measurement, scale and map orientation exercises are similar, but Tobler includes Pestalozzi's Formenlehre—teaching of forms

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23 Along with Ritter's unpublished manuscript, it was later used by Henning (see discussion by Engelmann, 1981, pp.105ff; Deutsch, 1893).

24 After publication of Ritter's articles about Pestalozzi in 1808, Ritter sent copies of the relevant volumes to Pestalozzi which suggests that the Institute in Yverdon did not subscribe to and may not have had access to this north German publication.
and goes a step further than Ritter’s orientation exercises which were restricted to map
drawing. In Tobler’s system, ever larger landscapes were constructed by proceeding
geometrically from simple to complex forms, that is from one-dimensional points to
two-dimensional areas and ultimately to three-dimensional relief figures, e.g. mountains
and valleys. Ritter probably responded to this enthusiastically and associated it with
the theory of drawing he described in 1802.\(^{25}\) Like Ritter, Tobler adopted the
hydrologic model of dividing the earth into drainage basins and adopted a similar
method of mountain classification. This reflects a shared dependence on Bauche,
Gatterrer, and perhaps also Dampier and Mulgrave (Deutsch, 1893, p. 17). Like
Bauche, Tobler adopted the idea of the continuity of mountain systems which were
linked sub-oceanically. In contrast to his remarks in the *Sechs Karten*, 1806, Ritter
describes this teaching as a bit daring (noch manches gewagt)—perhaps the first sign of
his later rejection of the theory (Ritter, 1808c, p. 200).

The important difference between Ritter and Tobler, lies in what Ritter describes
as Tobler’s separation of *physische* from *physicalische* geography. In a footnote Ritter
writes that:

\[\text{Nur in diesem Punkte fand ich Toblers Behandlung von den im Juliusheft der}
\text{Päd. Bibl. 1806 mitgetheilten Bemerkungen verschieden, sonst aber in der}
\text{Hauptsache ganz das erfüllt, was dort als wünschenswerth aufgestellt wurde}
\text{(Ritter, 1808c, p. 198).}\]\(^{26}\)

This separation was understood by Ritter as a failure to address the influence of the
*Physische* on the *Topische* by integrating physics and natural history into geographic
instruction (Ritter, 1808c, pp. 199-200). Ritter acknowledges that the area which
Tobler had already prepared was sufficiently developed to justify its description as
science. But like Linder’s system, Ritter also sought to expand Tobler’s system to
include environmental causation. In 1807, this expansion was linked not only to

\[^{25}\text{Ritter may have understood Tobler’s process as an exercise in geographic}
\text{Aufmerksamkeit—attentiveness. Tobler’s adaption of Pestalozzi’s form-teaching may have}
\text{been also a point of departure for Ritter’s later discussion of horizontal-}
\text{and vertical-form teaching in geography (Ritter, 1828).}\]

\[^{26}\text{“Only in this point did I find Tobler’s treatment different from [my] communicated}
\text{remarks in the July volume of the Pedagogic Library in 1806 [i.e. GutsMuths journal].}
\text{Otherwise for the most part I found Tobler’s treatment as a complete fulfilment of what}
\text{I had argued was desirable.”}\]
Ritter's own concept of a larger domain for geography, but also to the application of Pestalozzi's idealistic thinking, that is the use of *Urtypen* and *Urformen*. This was reinforced by his examination of Hopf's instruction in natural history.

When Ritter observed Hopf's instruction in natural history, Hopf gave a convincing performance of the power of the method by leading his students through the collective verbal recitation lessons or *Wortlehre* which was part of the Pestalozzi Method. Ritter was very impressed and recorded the session in outline form in his diary. Firstly, what is an animal? How many animals are there? What are their names?...then the parts of an animal...their names, number, position, comparisons. Which animals have eyes, ears...which have eyes, ears and nose...which have wings, feathers, two feet, four feet, etc. Ritter observes that also in this application of the Pestalozzi Method:

...lernt das Kind erst alle Teile, alles vergleichen, und kommt zu dem allereinfachsten, natürlichen System, das alles umfaßt... (Ritter, 1808, in Plewe, 1959, p. 141).

Ritter described the procedure as "vortrefflich"--excellent, and "notwendig"--necessary, but he expressed concern to Hopf about the unwieldy extent of materials which must be mastered and how this problem could be avoided. Different suggestions were offered, but Ritter pursued the problem further with Tobler and Niederer. This discussion is not recorded in Plewe's transcriptions, but Ritter addresses the problem in his "Second Letter" and the discussion gives rise to the most important ideas that Ritter derived from Pestalozzi.

According to Ritter, the problem of applying the Pestalozzi Method to science consists of two related questions. First, Ritter asks how is it possible to produce synthetically an exhaustive knowledge of an infinite nature? And secondly Ritter asks how the method itself can be disseminated when the necessary explanation of the premises upon which it is founded is of an incalculable length (Ritter, 1808c, pp. 205-6). The first problem is the most important, and Ritter says Pestalozzi had considered it for some time and solved it by relying on *Urformen*--essential forms. This was the substance of the Garden-Conversation. Ritter writes that:

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27"...the child learns first the parts, and to compare everything, and comes to the simplest natural system which embraces all..."
All objects in nature are material expressions of an idealistic substratum of forms. The uniqueness of a particular empirical object is merely a function of the peculiar environment of its occurrence. All real objects are environmentally conditioned versions of the ideal form after which they are modelled. Just as Blumenbach's collection and measurements of skulls gave rise to a mathematical mean, so could such a mean be contemplated as an ideal form which is made clear and distinct, by careful observation and comparative refinement of those objects which occur randomly in one's own immediate visual horizon. In Pestalozzi's words to Ritter, there was in man's cognitive structure: "...ein Ur-Urbild von allem"--an essential arche-image for everything (Pestalozzi as cited by Ritter, 1808c, p. 206). Whereas an exhaustive knowledge of the infinite objective world was impossible, a knowledge of the finite number of ideal model forms was conceivable.

Ritter does not use the example of Blumenbach's work to illustrate this point and there is little in Blumenbach's work to suggest that Blumenbach believed in ideal forms, innate or otherwise. Nor does Ritter use the example of Sömmering's comparative anatomy, despite Sömmering's acknowledgement of model forms. Instead, he finds in Alexander von Humboldt's inductive system the most illuminating example. He writes that the similarities between von Humboldt and Pestalozzi are remarkable, because Pestalozzi was not a natural historian and von Humboldt was not a pedagogue. Despite this difference, both thinkers arrived at the same conclusion. For Ritter, Pestalozzi's independent philosophical derivation of ideal forms was confirmed by von Humboldt's scientific derivation of Hauptformen--main forms (Von Humboldt, 1806). Ritter also cites Johann Forster's Enchiridion historiae naturali inserviens, 1788, and recognizes Forster as a man whose knowledge of nature was also based on cognition (Anschauung). He observes that Forster found it necessary to classify flora and fauna according to types (typum) or norms (normam). He observes that this work pre-dates the Pestalozzi Method but is expressive of both the spirit and form of the Method (Ritter, 1808c, p. 208). To strengthen his argument for

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28"...in nature there must be archeforms, or archetypes according to which all else arrange themselves as secondary forms."
Pestalozzi's originality and independence, Ritter notes that neither Pestalozzi nor his associates had knowledge of Forster's work. But Ritter was probably unaware of Pestalozzi's long association with Lavater. Nor did he know that Lavater's *Physiognomische Fragmente*, 1775-78, was an important source for von Humboldt's thinking (Beck, 1981b, p. 95).

The clearest expression of Ritter's new concept of geography is found in his response to Niederer's ideas about applying the Pestalozzi Method to historical instruction. In this discussion, Ritter advanced the idea of uniting history and geography by reducing determining relations to ideal forms. Ritter suggests that human groups and their territories could be reduced to ideal forms or what he describes as an *Urtypus der Länder*—arche-land-types, and an *Urtypus der Völker*—arche-folk-types (Ritter, 1807, as cited in Plewe, 1959, p. 141). Ritter does not elaborate in his diary, but he notes that neither Niederer, Tobler or Mieg understood entirely his meaning. In his "Second Letter" he explains further that the archetypes (Urtypen), as employed by von Humboldt, could be extended to include the basic elements of *physische* and *physicalische* geography. Geography and history could be taught by using the Pestalozzi Method to raise the students' consciousness of these idealistic elements. Presumably these basic elements included what Blumenbach, Ebel, Sömmering and others recognized as climate, food, way of life, etc.

Ritter left Yverdon with a multitude of new ideas and perspectives. He was so stimulated that he returned repeatedly to the Pestalozzi Institute in following years. None of these subsequent meetings were as important as his first when he was introduced by Pestalozzi and his collaborators to idealist philosophy in a pedagogic context. He was so interested in the application of this thinking to geographic instruction that he spent the following two months in Frankfurt studying these ideas and preparing review articles for GutsMuth's and Zerrenner's journals. In the midst of this period of pedagogic and scientific contemplation, Ritter received a further intellectual jolt by the unexpected visit of Alexander von Humboldt. Characteristically, Ritter seized this providential opportunity and initiated an exchange of ideas that gave decisive impulse to his geographic endeavours. In the development of geographic science and methodology, this may have been the most important meeting of the nineteenth century.
Meeting with Alexander von Humboldt (October 1807)

Alexander von Humboldt's visit to Frankfurt in October 1807 was indispensable for the development of Ritter's concept of geography. The visit occurred while Ritter was synthesizing the knowledge he acquired in Yverdon and preparing his notes about Pestalozzi for publication. The visit with Ritter was not planned. There is no evidence that he sought to meet von Humboldt as he did Pestalozzi. Instead the meeting was a fortuitous crossing of paths. Von Humboldt stopped in Frankfurt en route from his home in Berlin to Paris, where he would promote and publish the results of his extended labours in South America. Frankfurt was an interesting place to stop in these times. There were political discussions about the suitability of the Code Napoleon. There were also scientific discussions among doctors, mining engineers, botanists and academics who taught at the nearby university in Aschaffenburg. Von Humboldt was an associate of Ebel and shared an interest in geology, geophysics and travel. Ritter writes that he met von Humboldt on the first night of his visit, presumably through Ebel's introduction and he notes that he witnessed numerous discussions von Humboldt had with botanists, geologists, physiologists, historians, etc. Von Humboldt visited the Hollweg house and read a paper about deserts in South America which he had presented earlier to the Berlin Academy of Science. Ritter accompanied him around Frankfurt for at least eight days and Von Humboldt who was ten years his senior may have asked Ritter to act as a guide and help him carry his numerous maps and collections which were the subject of discussion. But Ritter was not merely von Humboldt's valet: von Humboldt engaged in long conversations with him about geography.

It is very likely that von Humboldt knew of Ritter's *Sechs Karten* before he came to Frankfurt. He would have been especially interested in Ritter's inclusion of a chart similar to his own chart of Chimaborazo, emphasizing interhemispheric comparisons. Von Humboldt would have recognized a new cartographic endeavour emerging, that is, an attempt to produce a comprehensive set of systematic thematic maps for a region. Von Humboldt who was interested in all intellectual endeavours of the time would have listened with interest to Ritter's account of Yverdon and the latest developments in the legendary drama of Pestalozzi's life. He would have taken an interest in Ritter's idea for a new scientific geography conceived in accordance with the philosophic and pedagogic principles of Pestalozzi. Unlike Niederer and Tobler in Yverdon, von Humboldt would have visualized immediately what Ritter hoped to
accomplish by applying ideal forms to geography. Von Humboldt certainly did not discourage Ritter from publishing such a view, nor obviously did he object to Ritter's citation of his work in connection with this thought. He may have been responsible for Ritter's citation of Forster's normative types which added further support to Ritter's thesis.

Von Humboldt's effect on Ritter was not necessarily a one-way affair, nor was Ritter a passive recipient of the knowledge of the world famous traveller. Ritter had his own carefully considered ideas about geography and natural history and their interrelation which were confirmed and augmented by von Humboldt's visit. Von Humboldt may have been surprised at the novelty of Ritter's ideas. It would be interesting to compare carefully von Humboldt's works of 1805-1807 which were written hurriedly to satisfy public demand for the results of his trip to South America, with his more fully considered publications which began in 1808, particularly his *Ansichten der Natur*, 1808 (von Humboldt, 1805, re. 1960, p. 23). Such a comparison may reflect some minor but significant rewordings which would reveal Ritter's influence--perhaps his expanded concept of geography which included human cultural forms and the determinants of their differentiation, or perhaps the application of the concept of a physiognomy of nature to include human or cultural physiognomic forms. For in 1807, von Humboldt writes of a *Pflanzen-Geographie*--plant geography, which includes many cultural observations and questions whether the title is really appropriate (Humboldt, 1807, p. 44). In some measure, Von Humboldt was already practising what Ritter had merely conceptualized, and in this way Humboldt's chief influence on Ritter may have been by providing Ritter with a glimpse of how a scientific comparative geography might actually look.

The influence of von Humboldt on Ritter is unequivocal. Ritter was thrilled to have met him as much for his knowledge of distant lands as for the general breadth of his knowledge and the elegance of his style. Ritter was stimulated sufficiently to read all von Humboldt's published works which were available in Frankfurt at that time, and as Ritter describes it, he devoured them with a kind of "Heißhunger"--hot hunger, and as he also observes, it enhanced his conversations with von Humboldt by giving him common points for discussion (Ritter, 1807, in Kramer, 1876, p. 113). Ritter was familiar already with von Humboldt's *Ideen für eine Physiognomie der Gewächse*--Ideas for a Physiognomy of Vegetation, 1806, which he mentions in his 1806 article and
whose influence is discernible in the *Sechs Karten*, 1806. This is the important connection with Pestalozzi’s ideal forms. But Ritter also found confirmation of his ideas in von Humboldt’s *Geographie der Pflanzen*—Geography of Plants, 1807, his comparative anatomical work *Beobachtung aus der Zoologie*—Observations from Zoology, 1806, as well as the purely descriptive scientific work *Naturgemälde der Tropenländer*—Natural Portrait of the Tropics, 1807. Ritter’s interest in botany may have led him to von Humboldt’s work on plant physiology of 1798 and his related galvanic works, but there is no evidence to suggest that Ritter studied his early geognostic writings of the 1790s.

The physiognomic component of von Humboldt’s thinking which was the focus of Ritter’s interest as he recorded in his "Second Letter." It is in the two-fold philosophic and scientific origin of this physiognomic concept that the significance of this episode lies. For Ritter, October 1807 was the time when these two sources were united and applied to his enlarged concept of geography. This dual character of Ritter’s physiognomic thinking has also been observed if little elaborated in a short work by Hanno Beck. Beck correctly notes that the concept as derived by Ritter from Pestalozzi had to do with the fundamental category of cognition (Anschauung) which formed the basic premise of Ritter’s work, or as Beck himself writes:

...Die äußere wird innere Anschauung, und diese lichtet die Fälle der Natur zu Typen des Reliefs, auf denen sich menschliches Leben vollzieht (Beck, 1981b, p. 94).29

Beck suggests that von Humboldt received a similar stimulus from Goethe who had also considered the concept of *Anschauung*, possibly under Kant’s influence. (Ibid., p. 94). Beck refers to a work by Goethe (1780) which pre-dates Kant’s critique (1781). He suggests that Goethe was an important mediator for this concept for Ritter and von Humboldt, but does not systematically elaborate this connection. Beck does observe that von Humboldt had learned about the concept of physiognomy from his earlier Göttingen teacher Georg Christoph Lichtenberg whose thoughts were contained in a work entitled: "Ueber Physiognomik," 1778. This was not so much an original work as a commentary on J.C. Lavater’s *Physiognomische Fragmente*, 1775-1778, which was

29"The external becomes internal cognition, and this reduces the cases of nature to types of relief, upon which human life unfolds."
a scientific, or perhaps pseudo-scientific attempt to explain how external appearances of the human form could be read to evaluate internal characteristics.

In volume II, 1776, Lavater speaks of an Urgestalt—essential shape and Ausbildung—formation or development, and describes physiognomy as the science of distinguishing between these, that is, in recognizing what was essential and what was peculiar of a particular person, or what individual characteristics can be distinguished from the essential form (Lavater, 1776, v. II, p. 146)—a process that von Humboldt later understood as abstraction from localized phenomena (von Humboldt, 1806, p. 28). Lavater does not elaborate the obvious extension of this thinking to nature or natural forms, although he notes the possible usefulness for what he calls Lithotheologie and also makes a few observations about animal characteristics. Likewise, Lichtenberg confines his discussion mostly to humans, although he mentions by analogy an example of applying physiognomical thinking to rock-types (Lichtenberg, 1778, re., 1800-6, v. III, p. 435).

Herder and Goethe both extensively applied the concept to nature and are perhaps the most important disseminators of the idea as H.B. Nisbet has repeatedly and authoritatively demonstrated (Nisbet, 1967, 1970, etc.). The first nine books of Herder's Ideen, 1784, are pervaded by such thinking, and this is a work which Ritter knew well and was important for all intellectuals of this period including von Humboldt. Beck is correct if he means that Goethe was a "general" mediator of this idea, but for Ritter, the most important source was Pestalozzi who clarified what Ritter may have observed in Herder and others, although Ritter never cites Herder or others in this regard.

In noting von Humboldt's discussions with Ebel, Ritter might have observed Ebel's use of physiognomic thinking. Ritter notes that von Humboldt's discussions with Ebel concerned not only mineralogy and geology, but also the construction of the earth and the physiognomy of mountain chains (Ritter, 1807 in Kramer, 1875, p. 112). After Ritter's trip through the Alps, there is little doubt that he would have taken an active part in this conversation and would have carefully read Ebel's Ueber den Bau der Erde, 1808, which was in its final stages of preparation at this time. In addition to this application of the physiognomic concept, Ritter also observed another thread that was common to Ebel and von Humboldt—the theory of galvanism which Ebel
applied to the earth as a whole. Earth electricity received special treatment in von Humboldt’s Naturgemälde der Tropenländer, 1807 and was subsequently incorporated in his better known Ansichten der Natur, 1808.

In addition to these themes, Ritter probably discussed with von Humboldt what geography as an empirical science should be, and this would have included the comparative method—a tool which von Humboldt acquired and learned to employ under the supervision of Werner at the Freiburg Academie. The extent of Ritter’s familiarity with von Humboldt’s comparative geognostic work is unknown, but Ritter knew the work of von Humboldt’s personal friend Freiesleben who employed the same comparative procedures. It is not certain if Ritter knew that von Humboldt accompanied Freiesleben on scientific trips through the Bohemian Mittelgebirge, Alps, Savoy and the Swiss Jura and that Freiesleben drew upon von Humboldt’s botanical expertise (Gümbel, ADB 7: 339; Freiesleben, 1792, p. 264). Ritter was certainly familiar with von Humboldt’s use of comparison from his writings of 1805-7 which summarized the results of his Peruvian trip of 1799-1804. Here again von Humboldt makes very clear remarks concerning the empirical methods of geographic and natural historical research and rejects explicitly the rationalism of Schelling and the German School of Naturphilosophie (von Humboldt, 1807. p. 24).

In his Geographie der Pflanzen, 1807, von Humboldt observes that despite the work of Willdenow and other botanists, the geography of plants as a discipline existed only in name. But von Humboldt was convinced that such study would produce useful materials for a history of the planet. Plant geography would be a discipline which would consider vegetation not merely in accordance with the relations of distribution by climate and elevation, i.e. air pressure, temperature, humidity, electrical tension, but also in relation to animals and human activity. Theoretically the discipline should investigate:

...ob man unter zahllosen Gewächsen der Erde gewisse Urformen entdecken, und ob man die specifische Verschiedenheit als Wirkung der Ausartung und als Abweichung von einem Prototypus betrachten kann (von Humboldt, 1807, r.e., 1960 , p. 35).30

30"...whether one can discover among the innumerable plants of the earth specific archetypes, and whether one can consider the specific differences as the effect of degeneration and as deviations from a prototype."
He argues that this physiognomic study is indisputably the most important basis of nature description (Ibid., p. 29) and this in turn solves the most important and most often argued problem of whether there are plants which are peculiar to the various climates, elevations and regions (Ibid., p. 35). It is for this reason perhaps that von Humboldt urges the need for comparative work:

Es schien nicht unwichtig, einige Rückblicke auf die gemäßigte Zone zu werfen, und die Vertheilung europäischer Pflanzen mit der südamerikanischen zu verglichen (Ibid., pp. 25-6).31

In so doing, von Humboldt tentatively questions whether there is a real physiognomic, i.e. essential difference, between the vegetation of Africa and South America. This leads him elsewhere to suggest that these two continents may once have been united because the underlying physiognomy was the same (Ibid., pp. 35,45). In terms of pure botanical science, von Humboldt is critical of existing botanical taxonomies arbitrarily based on the flowering systems of plants. He argues that often the physiognomically derived plant types and classes deviate from these other so-called natural systems. He argues that a careful graphic portrayal of the physiognomy of various plant groups would be very worthwhile because these physiognomies cannot always be described adequately in language.

Von Humboldt’s plant geography is something of a misnomer by his own admission, for it includes observations of the social and political relations of human groups. These observations are embraced logically in von Humboldt’s plant geography by virtue of the central role plants play as the primary determining element of a region’s character. When von Humboldt speaks elsewhere of: "...ein organisches Gewebe"—an organic web, which "...lagert sich schichtenweise...auf das andere"—lays itself down in layers...one upon the other, he has in mind the interconnection of all life within an area (von Humboldt, 1806, re., 1959, p. 26). Plant life was conceived as the interconnecting medium which laboured:

31"It appears not unimportant to bear some consideration on the temperate zone, and to compare the distribution of European plants with that of South America."
den rohen Stoff der Erde organisch aneinander zu reihen, und verbreitend, durch lebendige Kraft, zu mischen, was nach tausend Umwandlungen zur regsamten Nervenfaser veredelt wird (Ibid., p. 25).\footnote{...to arrange the raw materials of the earth organically, and through living force to mix what after thousands of transformations is refined to active nerve fibres.}

Humankind is what von Humboldt has in mind as the evolutionary product of these thousands of transformations. Plants are the primary link between the human species and the raw earth and therefore are the primary elements that produce the structure of human organization (Ibid., pp. 26, 30).

It is hard to say how von Humboldt and Ritter would have reconciled their different ways of contemplating and delineating appropriate units of geographical analysis. In 1807, Ritter was committed to a hydrologically delimited anthropogeographic unit. On the other hand, von Humboldt had a philosophically more complex concept that integrated elements from romantic aesthetic theory. While Ritter's mentor, Blumenbach spoke of a Totalhabitus which was used to derive taxonomic units in natural history, von Humboldt spoke of a Totaleindruck—total impression, characteristic of "Weltgegenden"—world regions (Ibid., p. 30). This Totaleindruck consisted of the distinguishing elements of an area, the outline of the mountains, sky colouring, as well as the physiognomy of plants and animals. Just as plants played a role in determining cultural forms, von Humboldt maintained that plants were the primary elements in the collective complex impression of an area (Ibid., p. 30). In order to distinguish or "individualize" a region, von Humboldt argues that one must learn to recognize at a glance the underlying physiognomic forms that characterize the region. Hence Europe has its own individual physiognomy as does South America, Australia, etc.

The vertical or physiological linkage of human groups to their territories was perhaps just as tight as Ritter's system, but von Humboldt does not seem to share Ritter's focus on individual anthropogeographic units. In 1807, von Humboldt's geographic units were conceived at a continental scale reflecting perhaps the scale of his comparative work. This thinking might have encouraged Ritter's discussion of continental individualities in the introduction to the Erdkunde in 1815, but Ritter
probably recognized this himself as a literary device. In an odd way, both Ritter and von Humboldt could claim that their respective geographic units, or concept of regions, were empirically derived. But in comparison to von Humboldt who emphasized underlying physiognomic differentiation derived from observation, Ritter's hydrologically derived natural delineation could only appear as a rational analytic concept. In 1807, Ritter had not yet abandoned this position.

The two-month period of September to October 1807, was a period of great revelation in Ritter's intellectual life. His first revelation came from Pestalozzi who introduced him to a concept of Anschauung which was based in an unfamiliar level of consciousness derived from Leibnizian psychology. The second revelation came from Ritter's discussions with Niederer and Tobler who explained that the Pestalozzi Method could be used also as a basis for science. The idealistic forms which formed the foundation for instruction were also the fundamental building blocks for science. A third revelation was Ritter's own self-actuated realization that this thinking could be applied to geography. The determining elements of geographic differentiation could be conceived as idealistic building blocks for the construction of a new independent geographic science. This formed the basis (Grundidee) for Ritter's Erdkunde. Likewise, the comparative faculty of mind could be employed synthetically in order to derive and refine these ideal elements by examination of how they repeat themselves throughout the world. It could be employed to identify the individuality of particular regions or natural phenomena by abstracting away all shared characteristics.

Von Humboldt played an important part in this process of revelation as an independent scientific authority who could verify the applicability of an idea which was philosophically derived. This scientific legitimacy was a hidden support for Ritter's acceptance of Pestalozzi as the primary force behind his method. Von Humboldt also legitimized Ritter's personal view of a larger domain for geography as a science which included the elements and processes of spatial differentiation. Above all, Ritter gained from his meetings with von Humboldt great confidence in his knowledge of science and as a scientific practitioner. The following years with his students in Frankfurt were dedicated to the completion of their education and in his limited free time to the preparation of a handbook to accompany the teaching of geography at the Pestalozzi Institute in Yverdon. It was a necessary preparatory step for his later conceptualization.
of the *Erdaunde* and also reflects his continuing commitment to pedagogic undertakings.

**The Lost Manuscript of 1810**

In the next few years, Ritter’s time was constrained by his growing ties to the Frankfurt-community. He was a founding member of the scientific Wetterauische Gesellschaft and oversaw natural science in geographic respects and plant physiology (Ritter, 1808 in Kramer, p. 124). He engaged more in Frankfurt’s social life after he gained notoriety for a eulogy he wrote and delivered at a service commemorating the death of the Frankfurt painter Prestel (Kramer, 1875, p. 127). He also became closely involved with the Frankfurt Museum and was elected secretary in 1810. He continued his pedagogic pursuits by teaching in the Bunsen and Engelmann Institutes and meeting in a group with other tutors to assess their students and to discuss pedagogic problems (Ibid., pp. 128-29). He was closely associated with Mieg in a scheme to establish a new teaching institute and he travelled through the Rheingau with von Türk in search of possible locations for such an institute (Ritter, 1810 in Kramer, 1875, p. 143). The French occupation of Frankfurt was a continued cause of friction. In 1808 after the war with Prussia, the French army returned to France through Frankfurt and for several weeks the public was required to provide accommodation for soldiers who were rude and unruly. Ritter himself had to endure soldiers in the Hollweg house and was grateful when he had an opportunity for a brief respite in Schnepfenthal. But after Ritter’s arrival in Schnepfenthal, the thunder of cannons announced the passing of Napoleon en route to Erfurt for his meeting with Alexander I. Ritter stood with Salzmann at the window of Salzmann’s study and watched Napoleon and his troops march past (Ritter, 1808 in Kramer, 1875, p. 126).

In his limited free time, Ritter prepared a geographic handbook for use in the Pestalozzi institute. He writes that the work was the greatest source of enjoyment and was a refuge from the unpleasant circumstances that surrounded him (Ritter to Zerrenner, 1810, in Kramer, 1875, p. 138). In the years 1808-1810, Frankfurt was not only dependent on France but was being transformed into what Ritter describes as a "Großherzogthum"--dukedom (Ibid., p. 135). Ritter was very pleased with the result of his work and recognized it as an advance on previous works of a similar nature. He remarked that it was a substantial extension of his earlier *Sechs Karten* and he believed that in his new system of *physische* geography, he could see "...die Grundlage einer
Ritter entitled his work: *Handbuch der Allgemeinen Erdkunde oder die Erde, ein Beitrag zur Begründung der Geographie als Wissenschaft*—Handbook of General Earth Science, or the Earth, a Contribution to the Foundation of Geography as Science (Ibid., pp. 174-75). The work was never published and the manuscript is lost, but much is known about its content from Ritter’s own correspondence.

Ritter describes his handbook in great detail in a letter which was written probably in 1810 to GutsMuths who was preparing his own geography textbook. Ritter writes in pedagogic diction that he considers the Earth, not as a planet among planets, but rather as an independent object to be brought to consciousness (Anschauung) (Ibid., p. 175). He explains that he proceeds from simple unconditioned forms to complex conditioned forms so as to learn to reveal the individual character of naturally occurring phenomena, minerals, plants, animals, as well as human groups (Nationen) (Ibid., p. 175). The handbook consists of three main sections, or what Ritter describes as: the topische—topical or Orts-Kenntniss—place-knowledge; the formelle—formal or Form-Kenntniss—form-knowledge; and the materielle—material or Kenntniss der Bestandtheile—knowledge of the parts.

The topical section, consisting of twelve lengthy handwritten pages, dispenses with mathematical geography and focusses on the natural division of the earth’s surface. The formal section consists of thirty pages and constitutes Ritter’s physische geography. It includes discussions of the Hauptformen—primary forms, of the earth. These include the oceans, atmosphere and land, emphasising their mutual physical relationships. He describes this knowledge as the foundation of all geography and the basis for understanding the external conditioning influences (Impulse) on humankind and the history of peoples. The final section of Ritter’s handbook as described by Ritter in his letter to GutMuths consists of forty pages and ambitiously includes discussion of the general and special laws of geographic distribution for phenomena of all three natural kingdoms as well as a description of their characteristic forms, capacity to adapt and establish themselves in new areas, as well as a history of their migrations (Wanderungen). It includes a discussion of climate and geology, the former is understood as the determinant of organic distribution and the latter as the

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3 The manuscript may be among those materials which were destroyed in the war. See Plewe, 1959, pp. 98-9.
determinant of inorganic distributions. In 1810, Ritter had developed a deep interest in
the migration of species, especially the human species, for migration was closely
related to the role geography still played as a basis for history.

Schmitthenner provides additional details about Ritter's general *physische*
geography in his review of Wilhelm Henning's text *Leitfaden beim methodischen
Unterricht in der Geographie. Besonders für Eltern und Lehrer in Elementarschulen—*
Introduction to Methodical Instruction in Geography for Parents and Teacher's in
Elementary Schools, 1812. The preface of Henning's textbook acknowledges a
substantial debt to Ritter.

Schmitthenner reproduces a long extract from Henning's preface which quotes from
Ritter's manuscript describing his general *physische* geography. Here Ritter describes
the sequence of instruction as proceeding from the simple to the complex. For
example, landforms are studied in chronological sequence from the oldest formations
(Urgebirgsformation) to more recent carboniferous formations (Flötsformation) and the
newest volcanic areas (vulkanischen Gegenden). The material (Materie) part of
instruction begins with aggregate matter and proceeds sequentially to chemical
mixtures, organic life and ratio-sensual humanity. In practical terms this meant
beginning with mineralogy and incorporating climatic study to prepare a foundation for
the study of plant, animal and human distributions. Ritter explains that man is
considered only as natural man (Naturmensch) and in connection with human groups
that are products of natural relationships. When the student is familiar with the
elements which stimulate these groups then historical instruction should begin. The

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"The second part of general geography is general physical (physische) geography
or general natural description of the Earth. This part of geographical instruction is not
by us, but has been produced excellently by the great industry of Mr Carl Ritter, educator
in Frankfurt am Main."
Ritter writes that each of the first two sections must be accompanied by a map illustrating the content of that section with as few labels as possible. The third section must have two maps, but Ritter does not specify their contents. He suggests that actual classroom instruction requires several large maps so that students can see clearly the subjects of discussion. He also contemplates the production of an atlas which would form the background for an even larger educational undertaking. He writes that if his handbook was successful he would continue this work and expand it to include a handbook for *Völkerkunde*--Ethnic Science, and a handbook for *Politische Geographie*--Political Geography. The atlas which was necessary for these advanced courses would include what he calls *Character-Karten*--Character-Maps, which portray different physiographic regions, e.g. an alpine regime, a desert, a delta, etc. The atlas would include bird’s-eye views of various relief features such as archipelagos, river valleys, waterfalls, mountains, etc. Plant and animal physiognomies would be presented in geographic or climatic groupings, and mankind would be presented as children of nature in their physiognomic forms and in the setting of their great monuments (Ibid., p. 178). These should include the monuments of antiquity so that the student might receive a vivid perception (Lebendigkeit der Anschauung) of the past (Ibid., p. 178). This grand atlas envisaged by Ritter was quite a contrast to the atlases of the time. Ritter’s vision and the confidence he gained from his rapidly maturing views of geography and pedagogy explains his extended criticism of Heusinger’s atlas (1809) published in GutsMuths’ journal in 1810 (Ritter, 1810b, pp. 298-312).

The history of Ritter’s attempt to publish his manuscript is complex and includes many actors, among them Pestalozzi’s collaborator Wilhelm Henning who incorporated ideas from Ritter’s manuscript into his *Leitfaden*. The geologist Leopold von Buch also played a role. In 1810, Ritter met von Buch whom he describes as possessing a higher genius than von Humboldt and took such a great interest in Ritter’s *physische Geographie*, that he provided Ritter with unpublished information from his own geographic research (Ritter, 1810 in Kramer, 1875, p. 146). Von Buch criticized Ritter’s manuscript for being too carried away by Ebel’s vitalistic theories about the inner construction of the Alps, which contradicted von Buch’s own experience (Ibid., p. 179). This may have been an important reason why Ritter was...
reluctant to publish the work and why he encouraged Henning to use the material in his *Leitfaden*. Ritter prepared the handbook to fulfill a promise to Pestalozzi and not as a means of building a pedagogic reputation. Unless the lost manuscript itself can be recovered, little more is to be said about this episode than has been documented by Gerhard Engelmann (1981), Ernst Plewe (1959) and Heinrich Schmitthenner (1951).

**Further Travels and Study**

The remaining years of Ritter's teaching commitment to the Bethmann-Hollweg family included a considerable amount of travel which gave Ritter opportunities for both cultural and physical geographic observation as well as opportunities to meet several other important academics. There is nothing to suggest that Ritter experienced new philosophical or scientific revelations, but he did experience in late 1811 the shock of the deaths of both Salzmann and Zerrenner whom he described as his "geistigen Väter"—spiritual fathers (Ritter, 1811 in Kramer, 1875, p. 211). Ritter used his free time and the experiences of travel to deepen his knowledge of science and literature.

Ritter spent a year in Geneva with his students Philipp Sömerring and August Bethmann-Hollweg, met numerous well-known scientists including de Luc and Pictet and attended their lectures in physics and chemistry (Kramer, 1875, p. 190). He travelled in the Alps with a portable barometer and thermometer and made numerous atmospheric observations. His travel diary from 1812 records numerous mathematical computations of barometric correction factors which were probably associated with his observation of altitudinal variations in flora and fauna (Ritter, 1812a; Kramer, 1875, p. 206). The mountains around St. Gervais where Ritter spent the summer of 1812 provided him with an ideal opportunity to practise comparative observation. Mount St.Joli may have been for Ritter what Mount Chimborazo had been for von Humboldt. Ritter was also actively engaged with the literary world in Geneva. Ritter and his students had little desire to study French language and literature, instead they attended lectures by Jean de Sismondi and studied the literature of southern Europe (Kramer, 1875, pp. 188-89). Ritter was introduced by a Pestalozzi acquaintance to Madame de Staël who was an important figure in European romanticism. She invited Ritter to her literary circle at Coppet, where he met Wilhelm von Schlegel for the first time and discussed the problems of classical literature and philology (Ritter, 1812 in Kramer, 1875, p. 194). Despite his active involvement with the intellectual world in Geneva and his scientific travels in the surrounding mountains, by late summer 1812, Ritter
began to feel isolated from his friends and the intellectual life and literature of Germany (Ibid., p. 212). When he returned to Germany in October 1812, he was jubilant and happy to hear the German language again (Kramer, 1875, p. 213).

In the autumn of 1812, Ritter spent a month in Munich where he met Frau Bethmann-Hollweg and her older son who had arrived shortly before. He also had a happy reunion with the older Sömmerring who was working in Munich and who introduced Ritter to his academic circle. Among these acquaintances was Friedrich Schelling with whom Ritter forged a lasting friendship. Schelling’s calendar includes a bibliographic entry: “Pestalozzis Erziehung...Iferton [Yverdon] 1812” which suggests that they may have discussed Henning’s application of the Pestalozzi Method to geography which was published in Yverdon in 1812 (Schelling, 1812). Schelling’s writings about the Weltseele—world soul, may have suggested to Ritter the possibility of extending knowledge of the intellectual processes of the individual human minds to humanity considered as a whole or a collective mind. There is unfortunately insufficient space here to develop this argument. Ritter’s travel diary from this one-month period in Munich reflects his interest in the cultural amenities of Munich as well as the surrounding physical environment where he made geologic observations (Ritter, 1812b, pp. 79-80). Despite Ritter’s happy return to Germany and his reunion with the Sömmerrings and Frau Bethmann-Hollweg and her older son, Ritter’s journeyings were not ended.

After a period of discussion, it was decided that Ritter should accompany the two Bethmann-Hollweg sons to Italy where they would spend the winter studying art and architecture, but also in the hope that the climate would help the oldest Bethmann-Hollweg son regain his health. In the winter of 1812-13, a road-weary Ritter travelled to Italy with August and Wilhelm Bethmann-Hollweg (Ibid., p. 214). Like the stay in Geneva and Munich, the trip to Italy was enormously productive. Ritter visited most of the important cities of northern Italy and in Rome he met several famous German artists, including the romantic painters Cornelius, Overbeck and Thorwaldsen, as well as the lesser-known Niepenhausen brothers and the writer Zacharias Werner (Ibid., p. 221). But much of the trip was made with a heavy heart, for in Florence in January 1813, Wilhelm Bethmann-Hollweg, the older of his students, died after a sudden and short illness (Ibid., p. 217). In May 1813, after two years away from Frankfurt, Ritter returned to Germany with the younger student August, who was ready for university
training. He looked forward to returning to Frankfurt to visit friends, but in Stuttgart, he met Frau Bethmann-Hollweg and it was decided that he should travel directly to Göttingen where he would supervise the young Bethmann-Hollweg’s study at university.
In the summer of 1813, Ritter arrived in Göttingen with August Bethmann-Hollweg. Ritter’s obligation to the Frankfurt family was concluded, but Ritter was happy to continue his association with his student in Göttingen where he would act as friend and advisor for his studies (Kramer, 1875, pp. 222-23). This relationship probably included continued financial support to supplement Ritter’s savings from his years in Frankfurt, but Ritter’s choice of Göttingen as the place where he would continue his independent study and complete the writing of his long-delayed geography was based on the excellence of the university library, or as Ritter explained in 1815:


Göttingen was not far from Duderstadt where his sister’s family lived. This was an important consideration, for Ritter was close to his sister and had for some time expressed his desire for a family of his own. But this desire was secondary to what Ritter describes as his "...weit aussehenden Pläne und Hoffnungen für meine eigne Bildung"—wide reaching plans and hopes for my own education (Ritter, 1810 in Kramer, 1875, p. 137). His common domicile in Göttingen with his students August Bethmann-Hollweg and for a time Wilhelm Sömmerring fulfilled in part this familial

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1 "National education should remain the main subject of my labours..."

2 "The reason why I remain here in Göttingen in the place where I least desire to spend my life, is the quiet, leisure and the library, and to complete finally my geographic work to which I have dedicated already several years, and then to enter another sphere of activity."
desire. Ritter did not marry until after the publication of the second volume of the *Erdkunde* in 1819.

Göttingen was situated near the residence of the King of Westphalia and was not directly disturbed by the political events in neighbouring Prussia, even after the Battle of Leipzig (Kramer, 1875, p. 225). Despite this isolation, Ritter’s correspondence and the introduction to his *Erdkunde* written in October 1815 reflect his continued concern for Germany as a whole. In view of his birth in Brandenburg-Prussia, his upbringing in Thuringia and his many years in Frankfurt-am-Main, Ritter wrote to his sister that he was not sure exactly where his fatherland lay, but he was adamant that German culture and language as a whole should be protected and freed from foreign control (Ritter to sister, 1813 in Kramer, 1875, pp. 228-29). In 1814, Ritter made a short visit to Frankfurt where celebrations commemorating the expulsion of Napoleon from Germany brought him into contact with E.M. Arndt, the foremost poet of German patriotism, as well as Father Jahn, the proponent of the German Turnkunst—Gymnasts, who developed physical training into the basis of an *esprit de corps* for the Prussian military (Kohn, 1960; Kramer, 1875, p. 233). The following summer in Berlin during a two-month stay with his brother, Ritter had an opportunity to marvel at Schleiermacher’s sermons on national renewal and become a member of his religious circle (Kramer, 1875, p. 233). It was in the humanitarian spirit of national renewal, that Ritter carried out the final research and formulation of the plan and method for his work. In 1814, Ritter wrote to Pestalozzi that he looked to Prussia for spiritual leadership in the development of freedom and well-being of the German people. Despite his scientific pursuits, his resolve to work in national education was firm.


³"National education should remain the main subject of my labours, no matter how much lies in my way. These wonderous times consume all energy and concentration, but little by little I will awaken and return to my original occupations."
Ritter's concentration during this period was intense. After an especially strenuous period of work during which he rarely left his room he developed an eye ailment that caused him difficulty in late 1815 and early 1816 when he worked in earnest to bring his work to publication. This intensity arose from Ritter's commitment to complete the long-delayed project which he first envisioned in 1807 and from his concern about the future and the direction of his career. He was committed to pedagogy and wrote to his sister in 1816, that he would be happy to spend his years teaching as a "Dorfschullehrer" at a small village school like the one in Wilmersdorf where his oldest brother was a preacher (Ritter to sister, 1816 in Kramer, 1875, p. 246). But despite this modest ambition in the spirit of the Volksaufklärung of Zerrener and von Rochow, Ritter knew that his extensive labours prepared him for a wider calling. Ritter’s reputation among pedagogues, academics and the bourgeois classes assured him of a position in one of the many scholarly gymnasias of Germany. He was later offered teaching positions in the Weimar and Bremen Gymnasias, and was also asked to act as educator to the Princess of Weimar in very attractive circumstances—an offer Ritter avoided only with great difficulty and finesse (Kramer, 1875, pp. 246ff.). Despite the distractions of German politics, familial matters and career decisions, from 1813-17 Ritter was able to sustain the concentration necessary to complete the plan and method of his geography. It was on the strength of his manuscript of the introduction to Erdkunde alone, that Ritter was able to find a publisher before he completed the task of applying his method to Africa and Asia.

Ritter's period of study in Göttingen embraced the most important areas of his interest--classical studies, natural history and geography. He attended lectures by Dissen on Plato as well as Hugo’s "Encyclopedia." He had contact with the historian Heeren whose work he knew well and whose influence is evident especially in Ritter's Die Vorhalle europäischer Völkergeschichten--Prolegomena to European Ethnic History, 1820. Ritter also attended lectures in natural science, especially those given by the well-known geologist Johann Hausmann in mineralogy and geognosy and those by the botanist Heinrich Schrader. Of these two scientists, Hausmann left a lasting impact on Ritter and they became good friends. Ritter joined Hausmann's mineralogical field trips to the Harz which Hausmann required of his students and Ritter hoped to make a "geognostische Alpenreise"--geognostic trip in the Alps with Hausmann in 1815 (Kramer, 1875, p. 237). Though the trip was cancelled because of political
uncertainties of the time, Hausmann visited Switzerland in 1816 and benefitted greatly from Ritter's experience and letters of introduction. In addition to attending these lectures, Ritter pursued his own independent studies including a complete review of the primary literature in geography. This review more than anything convinced him of the plausibility and need for his Erdkunde by virtue of the many gaps and inaccuracies he continued to find since his serious inquiry had begun in 1808 (Ritter 1810 in Kramer, 1875, pp. 138-39).

Ritter's Review of Geographical Literature

Ritter's review of the geographical literature while in the library at Gottingen from 1813-1815 was exhaustive and according to Ritter necessary in order to interpret correctly the geographic and travel literature of past ages. His review included the classical works of geography including Arabian, Persian, and Chinese works and the works of Ancient Greece including Tacitus and especially Herodotus whom Ritter regards as the father of geography and whose work provided a model for descriptive reports (Ritter, 1817, p. 28). The writings and especially the maps of individual travellers and explorers provide the backbone for Ritter's Erdkunde. But like the eighteenth-century travel literature, the classical works were useful only in light of a knowledge of the Hauptformen--basic forms or Grund-Typus--basic types of nature which provide the key to their interpretation and to their use in the creation of a lebendige Anschauung--vivid mental image (Ritter, 1817, pp. 28-9). This was true not just of interpretation of travel texts, but also physiographic maps which Ritter considered useful in the same way that physiologists used collections of anatomical specimens. Only first-hand experience and observation of living nature could bring life to "dead" collections, whether they be animal carcasses or maps of terrain (Ritter, 1817, pp. 30-1). In preparation for the writing of the Erdkunde, Ritter directed great energy to the reading of physical geography books so as to understand the hidden theories which affected the accuracy and content of maps.

Ritter's physical geographic readings began with the work of Scheuchzer (1716) whom he describes as the first modern "Physico-Geograph." His readings included the theories of authors whom he studied previously, including Bauche, Gatterer and Zimmermann. He also read Schulz, Reichard and Zeune, the last of whom he had criticized repeatedly, but acknowledged as a source illuminating the work of many other geographers and scientists (Ritter, 1817, p. 30). Ritter's study was calculated to
fill the many gaps that he found in the literature, but despite his efforts he remained dissatisfied with this body of work. He did not criticize them as unscientific, but argued that their theories were speculative and gave rise to errors in the general geographic literature. These theories were held to be authoritative and were subsequently applied uncritically. Simply put, geographic literature was speckled with errors derived from insufficiently tested theories. The evolution of Ritter's relationship to Bauche's thinking is illustrative.

When Ritter first studied Bauche's theory in Halle under the physicist Gren, he had no reason to question Bauche's assertion of the continuity of mountain systems through sub-oceanic linkages. It was an accepted theory and was promoted by Herder among others. In Halle, Ritter's limited experience may have prevented him from distinguishing between those theories which had been tested thoroughly and empirically confirmed, and those derived rationally or deductively with little empirical observation. Ritter himself applied Bauche's theory uncritically in his *Sechs Karten*, 1806. After his meeting with von Humboldt in 1807, his position was equivocal. Ritter may have continued to use elements of the theory in his discussion of natural divisions in his unpublished handbook, but by 1815, after further independent study, he adopts a critical view and argues that this theory is not based on adequate observation, but rather on assumption. Ritter observes that the theory was accepted by Gatterer and Zimmermann and promoted as a natural method of oceanic division, but according to Ritter, this was merely an interesting opinion from a hypothetical standpoint (Ritter, 1817, p. 66). By 1815, Ritter is less convinced also by the postulated system of *Gebirgsnetzen*—mountain grids, which include mountain equators, parallels and meridians as a means of natural division. The physical geographer Schulz describes this system in his *Ueber den allgemeinen Zusammenhang der Höhen*—Concerning the General Interconnection of the Heights, 1803 (Ritter, 1817, p. 67). This was the view adopted by Tobler in Yverdon (Deutsch, 1893). Ritter warns that the works of other geographers and scientists such as D'Anville, Arrowsmith, La Pie, Sotzmann, Mannert, Streit, Reimann, Reichard, Schmidt, Klöden, et.al., despite their overall excellence, must be used with care. He characterizes them as "symbolisch"—symbolic or even "hieroglyphisch"—hieroglyphic (Ritter, 1817, p. 30).
The Hausmann-Schrader Lectures

In addition to Ritter's independent geographic study, he attended many lectures in Göttingen where he was warmly received as an experienced and serious scholar. These lectures included Schrader's botany, but more importantly, Hausmann's lectures on mineralogy, geology and geognosy. During the course of these lectures Ritter and Hausmann became lifelong friends who understood each other's work as mutually beneficial. Ritter saw Hausmann's work as a contribution to his own understanding of the processes of the lithosphere and Hausmann understood Ritter's work as providing a focus or giving meaning to the efforts of various individual sciences—including his own contributions to mineralogy, especially crystallography. As Hausmann wrote in October 1815:

"...mein Forschungskreis ist in dem Ihrigen eingeschlossen und greift nach allen Seiten in die ungleich weiteren Strahlen des Ihrigen ein...ist es mir denn auch von so unbeschreiblichem Werthe, daß Sie in diesem Winter mir einen Theil Ihrer kostbaren Zeit, zur Anhörung meiner krystallogischen Vorträge schenken wollen (Hausmann to Ritter, 30.Oct.1815 in Wappäus, 1879, p. 3)."

Hausmann was a few years Ritter's junior, but his knowledge of mineralogy and geology was extensive and he was recognized as an authority in his field. In 1806 during a research trip in Norway he met and established simultaneously with von Buch the foundation for a geology of Norway and Sweden (Fischer, NDB 8: 125).

Hausmann shared with von Buch a commitment to the comparative approach to geological investigation as is reflected not only in his published work, but also in his correspondence. For example, in 1816 after his journey through the Alps, he summarized the results of his trip in a letter to Ritter:

"In den Uebergangsgebirgen der Schweiz kommt eine große Folge krystallinischer Gebirgsarten vor--Granit, Gneus, Glimmerschiefer, Talkschiefer, Chloritschiefer--Analoga der von mir im Norden entdeckten krystallinischen Uebergangsgebirgsarten. Jene haben aber einen vorherrschenden schiefrogen"

"...my field of studies is surrounded by yours and meshes in many points in the incomparably wider light of yours...it is therefore for me of such indescribable value that you want to give to me a part of your valuable time this winter to listen to my crystallogical lectures."
Like von Buch and the Freiburg School, Hausmann expended much energy upon comparative refinement of mineral taxonomy. But unlike von Buch, von Humboldt, and Freiesleben, who all received geological training in Freiburg, Hausmann was trained at Göttingen where he developed a special interest in crystallography and the chemical properties of minerals. This was the subject of his earliest work where he applied spherical trigonometry to crystal analysis and used the *Zonenlehre* system of C. Weiβ to develop a mathematically interconnected system (Gümbel *ADB* 11: 94). Ritter may not have been especially interested in this aspect of Hausmann’s work, but he later met Weiβ in Berlin who advised Ritter during the final preparation of the first volumes of the *Erdkunde*. Ritter may have been especially interested in Hausmann’s extension of crystallographic thinking to develop a general system for the entirety of inorganic nature which promoted the idea of *inorganic species* and the internal necessity which linked the system together (Gümbel *ADB* 11: 95). Ritter was familiar with these ideas and discusses them in the *Erdkunde*, but Hausmann’s fully developed system was not published until the appearance of his *Untersuchungen über die Form der leblosen Natur*—*Investigations of the Form of Inorganic Nature*, in 1821.

Hausmann is recognized also as the founder of rational soil science (*Bodenkunde*) (Fischer *NDB* 8: 125).

Hausmann gained great practical experience in the mines in Clausthal-Zellerfeld and was subsequently employed there from 1803 through 1805 as Bergmeister and as Kammersekretär in Braunschweig (Fischer, *NDB* 8: 124). This period of employment was interrupted by his geologic trip through Norway and Sweden undertaken from 1806-1807. The period following his return was difficult for Hausmann because of the French occupation but he eventually found an appointment as Generalinspector of Mines and Financial Secretary in Kassel in 1809. In 1811, after the death of J. Beckmann, he received a long desired call to Göttingen as Professor for Mineralogy and Technology. He was required to give lectures in Agriculture, Forestry, Mining

5"In the transitional rocks of Switzerland a large series of crystalline rock types appear--granite, gneiss, mica schists, talc schists, chlorite schists--analogs of the crystalline transitional rocks I discovered in Scandinavia. The former have however a predominatly slate-like character, whereas in Scandinavia the granular structure is more predominant."
and iron-smelting (Eisenhüttenkunde). This mixture of theoretical and practical experience in many aspects of mining and geology attracted many students as did his extraordinary lecturing abilities (Gübel ADB 11: 95). He remained in Göttingen until his death in 1859.

In 1813 when Ritter met him for the first time, Hausmann had published already several mineralogical and crystallographical works. His general views are contained in his Entwurf eines systems der unorganisirten Naturkörper—Outline for a System of Inorganic Nature, 1809, and this was followed by a practical three-volume Handbuch der Mineralogie, 1813-18 that led to his systematic work of 1821. In 1813, Hausmann had just completed the first parts of his Reise durch Skandinavien—Travel through Scandinavia, a travel summary written in the spirit of von Buch’s work and in a form that Ritter would have found congenial. It focussed specifically on the occurrence of granite and porphyry, and resulted in Hausmann’s questioning of the "...uranfähliche Bildung des Granits"—primeval development of granite (Gübel ADB 11: 94). Ritter’s knowledge of von Buch’s work may have been the original source of mutual interest for Hausmann and Ritter. But at a personal level, Hausmann and Ritter shared a deep-seated religious commitment which was probably fundamental to their life-long friendship.

Hausmann’s role in Ritter’s preparation of the introduction to the Erdkunde is evident in the reference Ritter makes to Hausmann’s systematic thinking. Although such systematic thinking did not provide any startlingly new ideas for Ritter, Hausmann’s concept of inorganic species may have reinforced Ritter’s knowledge of continuity in nature. Ritter may have found many of his ideas confirmed by Hausmann who shared with Ritter a commitment to empirical and comparative investigation. Ritter was in close contact with Hausmann for almost the entire period of the production of his methodological introduction and it was to Hausmann and Ritter’s younger friend Wilhelm Sömmerring that Ritter first read out loud the draft of his introduction. Hausmann was very enthusiastic and formally responded to Ritter’s reading in writing.

Mein ganzes Inneres ist ergriffen von dem, was Sie mir mitgetheilt. Ich weiß nicht welchem Gefühle ich mich mehr hingeben soll: der Bewunderung von dem, was Sie zu Stande gebracht haben; oder der Freude darüber, daß es auf solche Weise zu Stande gebracht worden; oder dem Gefühle der eigenen Ohnmacht, welches nie stärker erregt wurde, als durch Ihre Vorlesung. Was ich.
nur aus weiter, dunkler Ferne ahnen konnte, ist durch Sie schon in das helleste, erfreuendste Licht gestellt! (Hausmann to Ritter, 30.10.1815, in Wappäus, 1879, pp. 2-3).  

Heinrich Schrader’s lectures were also of interest to Ritter in as much as Ritter had developed since childhood an abiding interest in botany. Schrader was well-respected as a botanist for his literary work and for his work in the maintenance and development of the botanical gardens in Göttingen—a position which was earlier the province of the widely known botanist Hoffman. Schrader was a botanist who worked in the Linnaean tradition and undertook detailed studies of individual species. He was interested especially in the study of the flora of Germany. These interests are best expressed in his Flora germanica, 1806, which was considered a classic work in its own time and was recognized as a model for descriptive botany (Landsberg, ADB 32: 429-30). The work included exhaustive descriptions and many excellent detailed coloured drawings. This was also true of Schrader’s studies of rare plants which he cultivated in the botanical gardens so as to make the species available for scientific study. Such studies of rare species include his Sertum Hannoveranum, seu plantae rariores, quae in hortis regiis Hannoverae vicinis coluntur, 1795-1798, or his Hortis Göttingensis, sive plantae novae et rariores horti regii botanici Göttingensis, 1809. Schrader is remembered for his establishment and editorship of the Journal für die Botanik, 1799-1810 which was a forerunner and model for the long enduring Flora which began in 1818. In the period of Ritter’s stay in Göttingen, Schrader had begun the publication of his Monographia generis Verbasci which appeared over the period 1813-1823.

Schrader’s model descriptions and above all the beautifully prepared drawings that accompanied his works probably drew Ritter’s attention. Ritter the map maker strongly approved and commended the value of scientific drawings in all disciplines. In terms of the development of the Erdkunde, Schrader’s lectures may have deepened Ritter’s knowledge of species and classes of plants, and perhaps his knowledge of

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6"My innermost being is stirred by what you have communicated to me. I don’t know which feeling I should surrender myself to most: the admiration for what you have achieved; or the happiness that it has been achieved in such a way; or the feeling of my own inadequacy that has never been more strongly aroused than through your reading. What I could only foresee from a dark remote distance is now displayed by you in the brightest most delightful light!"
botanical sources, but the lectures do not appear to have offered any significant new conceptual insights of a theoretical or methodological nature. Schrader was an able if conventional systematic botanist and sought primarily to extend botanical knowledge within the existing Linnaean taxonomy. Ritter does not cite him in his discussion of botanical sources in the *Erdkunde*.

Ritter acknowledges the influence of Blumenbach in this period of independent study, but he does not specify which of his teachings were the most important and there is no evidence from Kramer's biography that Ritter attended lectures by Blumenbach. In the summer of 1815 before completion of his introduction, Ritter wrote to Sömmerring that he had benefited from the teachings of Blumenbach and Hausmann, and his work:

...eine ganze neue Gestalt erhalten [hat] und ich glaube, daß sie so zu einer scharfbegrenzten Wissenschaft in der Reihe der übrigen nachbarlich zur Selbständigkeit gelangt ist (Ritter to Sömmerring, 1815 in Kramer, 1875, p. 235).7

Ritter described his own work also as an "...fast thörichten Versuch"—an almost foolish attempt, to use everything available to be certain of his results (Ibid., p. 234). The intent of Ritter's "foolish" undertaking justifies the exhaustive research which he undertook. Ritter's description of his introductory chapter finished the previous day reveals the extent of the undertaking.

Ich habe die ganze Idee meiner Arbeit in ihrem Zusammenhange in sich und mit dem Felde der Wissenschaft, wie mit der Zeit und dem Bedürfniß derselben und mit dem äußeren und inneren Menschen nach den wichtigsten Richtungen hin zur Klarheit gebracht und so in den wesentlichsten Punkten auch das Verhältniß zum Vaterlande, zum Volke, zum Staate, zur Cultur und zur Geschichte mir entwickelt (Ritter, 1815 in Kramer, 1875, p. 238).8

7"...received an entirely new shape, and I believe that it has achieved independence as a sharply defined science in the series of neighboring sciences."

8"I have brought to clarity the entire idea of my work, its internal connections and its connections with the field of science in accordance with the current needs of the time. So too I have brought to clarity its connection to external and internal aspects of man in accordance with the most important trends; and so in the most essential points including the circumstances of fatherlands, peoples, states, culture and history, a different outlook developed in me."

232
The Method and Plan of the *Erdkunde*

Ritter’s geography as described in the introduction to the *Erdkunde* might be understood as existing within the larger teleological structure of his pedagogic goals—the development of human groups (Völker) to ever greater levels of perfection. It has been remarked that Ritter’s teleology stands like a scaffolding around the final edifice. But if such a metaphor is to be accepted, it must be added that for Ritter such a scaffold can never be dismantled, as the task of perfecting humanity will never be completed. But the metaphor belies an almost complete integration of this teleology into the internal methodological structure of Ritter’s geography. The concept of human development was conceived by Ritter and the pedagogues not as a rhetorical ideal, but as a formal intellectual undertaking which occurred by educating individual human beings in accordance with a specific set of psychological rules derived from nature itself. These rules, or the *Erkenntnistheorie* upon which the pedagogues based their systems of education, constituted the internal structure of Ritter’s teleology. Despite the existence of racial or cultural differences, by nature all humans shared the same structure of mind that had been investigated by philosophers and empirical psychologists in the eighteenth century. This structure was adopted and adapted quite seriously and scientifically in Ritter’s description of the methodology of the *Erdkunde*. In view of the central role accorded to *Erkenntnistheorie*, it is not surprising to find that one of the most fundamental goals of Ritter’s methodology is the development of a "lebendig"—living view of nature, or the development of "Klarheit"—clarity in understanding—both terms of which are important terms with precise meanings in eighteenth-century theory. If a scaffolding around the final edifice is to exist as a legitimate metaphor, it must be understood as a semantic scaffolding which envelopes the methodology of Ritter’s *Erdkunde*. It is indeed this same semantic scaffolding that embraces and gives precise meaning to the concept of general and comparative as in Ritter’s *general comparative geography*.

In October 1815, when Ritter completed the writing of the introduction, he was inspired emotionally by the reemergence of Prussia as the leading force in the German lands. Fresh in his mind were the human miseries that were associated with French suzerainty and the wars of conquest and liberation. In such a state, Ritter wrote what he described as an introduction to an attempt to represent collective earth science in an internally bonded, scientific whole (Ritter, 1817, p. 1). But such a science only had
meaning for Ritter insofar as it was pragmatic and useful to humanity— a view which he had first espoused in 1804 and elaborated in 1807 in his citation of the Fichte lectures (Ritter, 1804, p. vi; 1807c, p. 195). In 1815, Ritter had great concern for humanity whose immediate history was one of apparent retrogression. The first justification which Ritter gives for undertaking his all embracing science was the mitigation of war and associated human suffering. This he argues is achieved through an earth science which scientifically derives from or reveals the basic "Einklang"—consonance, that must exist between the people, the state and nature, for as he asserts:

...nur dieser Einklang zwischen Volk und Vaterland, zwischen Stellung des Staats zu Natur wie zum Menschenleben, oder zur Physik und Politik hat eben von der einen Seite her in der Weltgeschichte, das Blühen der Völker und Staaten bedingt und gefördert (Ritter, 1817, p. 7).9

Ritter argues that we must seriously and scientifically research the law of this "Einklang"—consonance as the eternal source of all harmony. This was the fundamental goal of Ritter's *Erdkunde* and was not a radical departure from the earlier work of Gatterer, who sought to define natural boundaries both as a scientific unit of analysis, but also as a practical means for determining the disputed boundaries between states. Ritter's work was received in just such a way (*JALZ*, 1820, p. 51).

Ritter adds a purely theoretical pedagogic note by observing that once revealed, this law of harmony must be inscribed (eingetragen) into consciousness (Bewuβtseyn); and this process of inscribing, originally a comparative pedagogic process, was adapted by Ritter as a comparative scientific methodology which was central to his *Erdkunde*. Ritter fuses pedagogic and scientific semantics together when on page one of the introduction he speaks of the common society of "clarity" and "truth" (Ritter, 1817, p. 1). The raw material for the scientific search for clarity and truth is the earth itself, or what Ritter calls the "Denkmale"—memorials or "Hieroglyphenschrift"—hieroglyphics of the earth—terminology which denotes also the larger physicotheological mission of the *Erdkunde*. The revelation of terrestrial laws lies in the proper deciphering of these hieroglyphics, and this is accomplished by ordering the earth's forms in accordance

9"...only the consonance between folk and fatherland, between the position of the state to nature and to human life, or to physics and politics, only this consonance, even considered in single aspects, has conditioned and promoted the blossoming of peoples and states in world history."
with their "wesentlichen Characteren"—essential characters. For only an ordering of the essential, gives rise to general laws. In eighteenth-century pedagogic theory, clarity either accompanied or was derived from ordering or as Ritter explains in the *Erdkunde*:

> Wo eine solche Einheit im Begriff sich zur Klarheit im Bewußtseyn erhebt, da geht aus ihr die Ordnung im Mannichfaltigen hervor... (Ritter, 1817, p. 8)."^{10}

It is in this process of ordering where the meaning of Ritter’s comparative method lies. For Ritter, clarity is achieved through comparison or juxtaposition of subjects so as to order them in accordance with their similarities or differences. This process is described not only in the "Plan des Werks"--Plan of the Work (pp. 8-19), but also in the "Methode der Anordnung"--the Method of Ordering" (pp. 20-25, esp. p. 25). The remainder of the introduction is devoted to "Quellen"--Sources (pp. 26-56), but here too are found many insightful references to the comparative method as applied especially to geology. The table of contents to volume one of the *Erdkunde* is abstracted and presented in Figure 8.1.

**The Plan of the Work**

Ritter’s description of the plan of the work follows the same general deterministic ordering as the *Sechs Karten*, 1806--an ordering which is described by many geographers as the *Länderkundliche Schema* of regional geography (Elkins, 1989, p. 24). But the deterministic foundation of Ritter’s *Erdkunde* goes further and includes what Ritter describes as cosmic forces (Erdkräfte) which are entropically conceived. Such forces create dialectical oppositions or polarities which determine the natural order, especially between animate and inanimate nature. These ideas are derived from a variety of sources, including von Humboldt and Ebel, and perhaps Schelling’s *Naturphilosophie*. Ritter qualifies his thinking by observing that the determining force becomes progressively less deterministic as one ascends from the inanimate to the animate creation, and finally to humanity, i.e. the intellectual (geistiges) level of creation. Determinism decreases as one ascends the chain. Human activity is not completely determined by physical forces, but cosmically derived geologic and climatic forces do generally prevail (Ritter, 1817, p. 8). If Ritter’s *Erdkunde* becomes progressively more speculative, it lies in his extrapolation of these cosmic forces to the

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10"Where one such unity in concept raises itself to clarity in consciousness, therewith arises the order of the plenitude..."
INTRODUCTION

Plan of the Work

The Fixed Forms of the Continents
The Fluid Forms or the Elements
The Bodies of the Three Kingdoms of Nature
Mankind

Method of Ordering

Sources

GENERAL COMPARATIVE EARTH DESCRIPTION

Preliminary Remarks—Air, Sea and Land

First Book—Africa

First Division—High Africa

Section 1: Southern Edge of High Africa
Section 2: Eastern Edge of High Africa
Section 3: Northern Edge of High Africa
Section 4: Western Edge of High Africa
Section 5: Northwestern Edge of High Africa

Second Division—The Steplands and River Systems of Africa

Section 1: Steplands in North Africa or the Nile System
Section 2: Steplands of Middle Africa
Section 3: Steplands and River Systems of Southern Africa

Third Division—The Isolated Mountain Sections of Africa

Fourth Division—The Lowlands of Africa

The Sahara, the Great Desert, Eastern Half
The Western Half of the Sand Ocean: Sahara and Sahel

Second Book—Asia

First Division—Eastern High Asia

Section 1: Eastern Edge of High Asia
Section 2: Northern Edge of High Asia
Section 3: High Plateau of Mongolia and Tatary
Section 4: Southern Edge of High Asia

Second Division—The Steplands and River Systems of Eastern High Asia

Section 1: Steplands of East Asia
Section 2: Steplands and River Systems of the Ganges and Indus

Third Division—The Isolated Mountain Sections and the Plains of Indostan
determination of human intellectual evolution and history—especially his ponderous theoretical opposition of Orient and Occident derived in part from Herder’s thinking. But he qualifies this extrapolation by observing that it was not yet known whether the same type of equilibrating resolution of cosmic forces would converge on a point of rest in human development, like it has in the physical world. Having accepted these qualifications, Ritter remains committed to a generally prevailing determinism which is active in both the intellectual and physical worlds (Ritter, 1817, pp. 8-9).

Ritter explains that the plan of his general comparative earth description is comprised of three fundamental parts which include: (1) the fixed forms of the earth (geomorphology); (2) the fluid forms (hydrosphere, atmosphere, and heat balances); and (3) the three kingdoms of nature (minerals, plants and animals). He discusses these three sequentially. Basic geology is modified by the fluid elements, especially climate, which brings forth a corresponding plant physiognomy which in turn conditions animal distributions, collectively forming what Ritter understands as a conditioning assemblage in which man makes his home. He concludes this section with a discussion of the dependence of human groups on nature. In the text of the *Erdkunde*, Ritter employs this framework to summarize the characteristics of individual cultural groups, such as his discussion of the influence of the Nile Valley on the culture of the Egyptians (Ritter, 1817, pp. 288). Just as each locality has its own unique character which is determined by the unique combination of these elements, so too is the history of a people conditioned by the local natural assemblage or what Ritter calls a "Lebensgürtel"—web of life (Ritter, 1817, p. 18). He asserts further that these unique or individual assemblages must be investigated comparatively or as Ritter concludes:

Auch hier muß die Vielartigkeit durch den angebahnten Gang sich zu einer größern Einheit zusammenordnen, wenn auch sie selbst in ihrer Klarheit nie entschleiert werden wird (Ritter, 1817, p. 19).11

This "angebahnten Gang"—prepared path or process, is an unmistakable reference to the comparative method, a faculty of mind which leads to ever increasing levels of clarity or knowledge.

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11"Here too must the diversity be ordered into a greater unity by the same method (angebahnten Gang) even the diversity in its clarity is never to be revealed [completely]."
The Method of Ordering

The meaning of the comparative method is explicitly laid out in Ritter’s description of the method of ordering the *Erdkunde*. It is expressed in scientific terms and related to other comparative sciences. This has been the subject of interpretive debates in the twentieth century. But it is also expressed in pedagogic terminology which has not yet been examined critically. In Ritter’s thinking the pedagogic and scientific elements are not separable. It is the semantic parallelism of "clarity" and "truth" which illuminates the interpretation of Ritter’s comparative methodology.

Ritter’s discussion of methodology begins with an explanation in scientific terminology that assumes an audience familiar with the practice of science in general. In addition to the definition he provides for the terms comparative and general, he also gives the example of Herodotus’ attempt to apply a similar comparative method to geography by comparing the Niger River in Africa and the Ister in Europe. Ritter describes Herodotus as "anschauungsreich"--rich in vivid images or cognitions, a clear reference to the *anschaulich* degree of universal or general knowledge within the *Helligkeitstheorie*. Ritter presents von Humboldt’s work as an example of comparative earth description where ideas and cognitions are condensed (zusammengedrängt) from the revelation of great laws and groupings. But Ritter descends deeper into a discussion of these cognitions which he argues are derived from the viewpoint (Haltungspunct) of an "ideale Hintergrund"--ideal background (Ritter, 1817, p. 22). It is only through an idealistic structure that empirical observations can be brought together into an ordered natural system—that is, only abstract concepts can be related into a holistic system. Without abstraction, without this idealistic substratum of essential forms, which Ritter soberly acknowledges as merely a hypothetical structure, it is doubtful whether mankind could ever assemble enough idiographic knowledge to bring a complete holistic system into view. Ritter’s *natural system* is an ordered system which, strictly speaking, is ultimately an intellectual construct. He argues further that the existence of this ideal background is more a question of belief than a structure which can be empirically experienced. He further acknowledges Pestalozzi as the source of this idea and asserts that this viewpoint is the basic idea (Grundidee) for his *Erdkunde* (Ritter, 1817, p. 23). It is this same viewpoint that he discussed with and was supported by Alexander von Humboldt in their Frankfurt discussions of 1807.

Ritter offers a series of fundamental rules of ordering which further illustrate his method. The first rule is a commitment to empiricism, or as Ritter writes:
Die Grundregel, welche dem Ganzen seine Wahrheit sichern soll, ist die von Beobachtung zu Beobachtung, nicht von Meinung oder Hypothese zu Beobachtung fortzuschreiten (Ritter, 1817, p. 23).

Ritter explains that if this procedure is followed and the individual facts are brought together (zusammengedrängt), a unified organization (Vereinigung) will arise. For example, Ritter sets up his study of Africa by criticizing Lacepede’s theory that Africa has a central highland plateau which is surrounded by ten different mountain chains (Ritter, 1817, p. 79). Ritter argues that the mountain chains are not separate from the central plateau, but are part of it. This conclusion is derived by compiling observations of travellers and explorers of the terrace lands which surround the central plateau. He begins with reports from the "Südrand von Hoch-Africa"—southern edge of high Africa (the terraces of the Orange River and Botswana) and then proceeds to reports from the eastern edge (the terraces of Natal, the source of the Zambezi River and Mozambique). He then passes over unknown areas to the northern edge (Aethiopian Highlands) and ends with a discussion of the western terraces of equatorial Africa (Ritter, 1817, pp. 80-217). His compilation of reports results in a unified conception—a mental image of a continental highland core surrounded by river dissected terraces.

Ritter explains further that if such a unity cannot be produced, then at least a comparison will arise (Ritter, 1817, p. 23). Ritter’s use of comparison here denotes a less consummate degree of knowledge. This is consistent with the structure of eighteenth-century Erkenntnistheorie. The level of mere comparison suggests that objects have been distinguished, but not yet generalized. Knowledge is not yet fully clear or distinct. For example, Ritter compares the rivers of Africa and Asia, and observes that Africa has fewer and smaller rivers. This leads to the conclusion that there is relatively less precipitation in the tropical region of Africa, than in that of Asia (Ritter, 1817, p. 79). But in the absence of conclusive empirical evidence, his argument must stop at the non-general comparative step of understanding where the simple conditioning elements have not yet been completely clarified. Only the characteristics of Asian and African rivers have been distinguished. The incomplete

12"The fundamental rule which should secure truth, is the advance from observation to observation, not from opinion or hypothesis to observation."
state of the *Erdkunde* suggests that Ritter never assembled completely the materials necessary for comparison and creation of a clear concept of the earth. But in the second edition he tells us that his discussion of Africa is relatively complete and can be considered as a whole (Ritter, 1822, p. xii).

The second fundamental rule which characterizes Ritter's method of presentation includes what Ritter describes as "...diejenige, welche das Räumliche bestimmt"—that which determines the spatial (Ritter, 1817, p. 24). Ritter distinguishes his *Erdkunde* from previous accounts of geography by its emphasis on the elements of physical (physische) determinism. Study of these elements made possible the development of comparative physical (physicalische) geography which Ritter explains is the starting point for his own work and what distinguishes it from previous political and mathematical geographies (Ritter, 1817, p. 24). Whereas earlier works enumerated the religions or technologies of countries, Ritter sought to develop a causal connection between the physical environment of a region and the types of religions and technologies that arose. For example, he argues that the periodic inundations of the Nile Valley resulted in a uniform system of beliefs among the valley dwellers. Likewise the periodic floods stimulated the sciences by encouraging the development of calendars, the observation of seasonal changes, and astronomy. Geometry was developed to reestablish property boundaries after periods of flooding (Ritter, 1817, p. 293).

The third fundamental rule reflects a commitment not only to empiricism but also to the synthetic operation of the mind which is a recurring theme throughout Ritter's early years. Like student instruction, Ritter writes that investigation should proceed always:

...vom Einfachem zum Zusammengesetztem, von den einzelnen Seiten zur Mitte oder zur Einheit, und von der Regel zu den Ausnahmen... (Ritter, 1817, p. 24).13

This meant proceeding from general determining mechanical, chemical or organic influences (i.e. physical forces) to the complex lifeforms which are conditioned by such forces, or as Ritter succinctly put it "...von der Natur zum Menschen"—from nature to

13"...from the simpler to the more complex, from single aspects to the mean, or to unity, as well as from the rule to the exceptions."
man (Ritter, 1817, p. 24). Individuality of human groups or regions is derived by abstracting away these common general conditioning elements. Ritter writes also that this means proceeding from simple to complex landforms such as from the heights to the plains or from the source of rivers to the river’s mouth. For example his discussion of the highland terraces of Africa is normally divided into three sequential chapters which proceed from the highland terraces, to the middle terraces, and finally to the coastal terraces. Likewise his discussion of Wassersysteme—water systems, or what he also calls the Stufenländer—steplands, proceeds sequentially in accordance with their Hauptformen—basic forms. These include the upper, middle, and lower river courses (Stromlauf) (Ritter, 1817, p. 253). A general theoretical discussion of river systems aptly illustrates the first of three subordinate rules which Ritter appends to his discussion.

The first subordinate rule illustrates the concept of comparison in developing clear concepts and links the entire structure of Ritter’s work unequivocally to eighteenth-century Erkenntnistheorie:

Eine untergeordnetere Regel bei der Ausarbeitung zur Beförderung der Klarheit ist die Gruppierung des Gleichartigen und Verwandten... (Ritter, 1817, p. 25).

The grouping of that which is "similar," or what may be scientifically rendered as "homogeneous" or "analogical," and that which is "related" aptly describes what was understood as the comparative faculty of mind by pedagogic theorists and the comparative method of induction by applied scientists. In this way, general or universal abstract concepts are generated. Ritter writes that when parts of river systems or steplands are compared with each other, as well as with the highlands and lowlands of the earth as a whole, the same succession of Hauptformen—basic forms can be observed in gradual development (Ritter, 1817, p. 253). This is attributed by Ritter to a homogeneous and simultaneous development of all water systems of the earth (Ibid., p. 254). The aim of his section devoted to the steplands of Africa (pp. 254-329) is to reveal the peculiar characteristics of individual rivers which are so varied that Ritter suggests that rivers seem to contradict the idea of homogeneity (Ibid., p. 242-43). For Ritter, this is an important undertaking because river systems are

14"A subordinate rule for the production and advancement of clarity, is the grouping of the similar and the related..."
among the most important determining elements in the formation of organic nature and the development of human culture (Ibid., p. 242).

The second subordinate rule is linked closely to the use of sources that Ritter employs as his information base for his descriptions of Africa and Asia. He refers to this rule as a rule for the understanding of the nomenclature and concepts of different times, languages and viewpoints. He argues that such an understanding can be achieved only by historical and geographical research into the origins of terms and concepts (Ritter, 1817, p. 25). This gives rise a few pages later in the discussion of his own conceptual sources to a fascinating application of philological analysis to his geographic investigation--a point which is elaborated below. In short, Ritter argues that the geographer must be critical of the descriptive sources employed as the basis for his own investigations and representations.

The third and final subordinate rule concerns what Ritter describes as the prior conceptualization (Hervorheben) of the essential structure (intensiven Größe) of objects (Erscheinungen), as opposed to the more randomly occurring external structure (extensive). It is not easy to translate Ritter’s phraseology precisely, but the terminology is both pedagogic and philosophic, and is derived from idealistic elements in Pestalozzi’s thought. Ritter clarifies his meaning by describing the rule simply as the "...nothwendigen Unterwerfung des Materiellen unter das allgemeine Gesetz"--necessary subjugation of material under general law (Ritter, 1817, p. 25). In 1807, it was explained to Ritter as the absolute form of the objective (Ritter, 1807 in Plewe, 1959, p. 139). For Ritter geography was ultimately an idealistic intellectual undertaking.

**The Sources for the Erdkunde**

In 1804, Ritter was reluctant to include a general introduction for his *Europa*. He argued that the material discussed in general introductions should more properly arise from the work itself. But in 1817, he provides what was understood by his contemporaries to be just such an introduction. According to Ritter, this was not his intention, and as he observes in the foreword to the second edition, if taken as such the introduction has many deficiencies and obscurities (Ritter, 1822, p. xiv). His real intent is linked to a critical review of contemporary scientific ideas so as to display critically his own perspective, as he in turn critically adopts the descriptions and notes
of earlier travellers and geographers in the light of their own beliefs, prejudices and scientific perspectives. In one sense, this introduction is Ritter’s contribution to his own posterity, so that his own work might remain useful to later scientists who must be critically aware of the scientific character of Ritter’s own time. It is important for Ritter to know whether the author of some regional monograph was resident in a coastal area or whether he was continental in outlook. Equally important was the author’s origin as either a highlander or an inhabitant of the plains. Ritter sensed that these factors conditioned the types and reliability of insights such writers were likely to have concerning various environments. It was important for Ritter to know whether a writer was an experienced man of science, or a man equipped only with theories and biased views (Ritter, 1817, pp. 27-8).

This critical position is derivative from Ritter’s own extensive reading in classical literature and especially the philological critiques of classical literature of which the period of German Classicism brought an abundance. This disciplined reading came in the first instance from formal instruction under the most eminent German philologist, August Wolf in Halle in 1798. The practice continued as an important part of Ritter’s instruction of the Bethmann-Hollweg children. In general, this critical position was part of the general rational relativism of the enlightenment. If the Holy Scriptures could be relativized to the period and purpose of their authors by rationalist theologians in the eighteenth century such as Semler and his followers, and if the writings of Homer could be relativized by Herder and Wolf into a non-Homeric collection of popular legends, then too Ritter could relativize the sources of ancient, medieval and modern geographic treatises into disciplined and useful sources of factual information. Ritter is explicit about this in the foreword to the second edition of the *Erdkunde* where he writes:

Denn wir erkennen auch in der Geographie, wie in der Sprachforschung, eine höhere Kritik an, welche, wie diese jeden Schriftsteller aus ihm selbst und aus seiner Zeit, nicht aus einer allgemeinen Sprachtheorie und Philosophie erklärt...(Ritter, 1822, p. xv).\(^{15}\)

\(^{15}\) "For we recognize also in Geography, as in linguistic research, a higher critique, which explains every writer in accordance to his own time, not in accordance to some general linguistic theory and philosophy..."
This is the apparent reason for Ritter’s extensive review of the theoretical sources which shaped his own approach to the *Erdkunde*.

Ritter does not discuss the role or process of comparative method in philological or linguistic studies despite the promotion of such study by Wilhelm von Humboldt in Berlin. But further examples and illustrations of Ritter’s understanding of the comparative method are scattered throughout this lengthy section of the introduction where Ritter enumerates and evaluates the scientific theoretical sources for the geographic concepts which are employed. He cites examples from what is understood today as geology, climatology, and biogeography which in the eighteenth and early nineteenth centuries existed as geognosy, atmospheric science, botany and zoology. If a relative importance must be assigned to these disciplines as sources for Ritter’s understanding of the comparative process, then the work of geologists should be especially mentioned.

Ritter calls attention to the application of the comparative method by followers of the Wernerian School, especially von Buch and von Humboldt who enriched their science with the method:

> Beide bereicherten ihre Wissenschaft zum großen Vorteil der Erdbeschreibung, mit der vergleichenden Methode (Ritter, 1817, p. 36).16

Ritter names Freiesleben as a third member of the early formed geognostic bond between these men. Ritter’s intimate knowledge of these long friendships suggests that his knowledge of their individual and collective efforts was also detailed. He was familiar with the original principle which guided their comparative investigations, or what he describes as Werner’s idea of the homogeneity (Gleichartigkeit) of mineral successions throughout the world—an idea derived from his precipitations theory (Ritter, 1817, p. 34). Ritter probably understood such homogeneous mineral sequences as "Ur-successions."

Ritter examines the application of the comparative method in atmospheric or climatic studies which at that time were closely related to studies of plant distribution.

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16"Both enriched their science to the great advantage of earth description with the comparative method."
He notes the central role of the barometer and refers to it as "...die Seele in der ganzen Anordnung des gegenwärtigen Werkes"—the soul of the entire structure of the present work (Ritter, 1817, p. 43). He traces the history of the barometer from Pascal’s conception of comparative barometric determination of elevation in 1648 to Scheuchzer’s first attempts to apply the idea to the Alps in 1709 (Ritter, 1817, p. 40). Likewise he mentions the utility of the hygrometer and thermometer in developing a theory of climate and vegetation for general earth science (Erdkunde). He cites the contemporary studies of Pictet who accompanied Ritter in the Alps where he made his own comparative measurements, but he mentions also de Luc, Ramond, and Studer all of whom compared simultaneous barometric readings over both large and small horizontal distances to establish patterns of atmospheric behaviour. He also cites the observations made throughout the world by the English and the French, but especially by Mutis and von Humboldt in Venezuela to establish atmospheric behaviour in the tropic zone. According to Ritter, this behaviour was confirmed and made useful to geographic science by the labours of Saussure, von Humboldt, von Buch and their students by comparing the general, climatic, geologic and vegetational relationships of the tropics with the temperate zones (Ritter, 1817, pp. 42-3). He concludes that it was only after a century of such study that Toumefort’s theory—the decrease of vegetation with altitude and the comparability of mountain vegetation with lowland vegetation at higher latitudes—was systematized and brought as a rich source of facts to the service of earth science (Erdkunde) (Ritter, 1817, p. 49).

Ritter observes the use of the comparative method in the study of individual species of plants and animals. He cites Flörke’s comparative investigation of cryptogamic flora which concludes that in contrast to the highly organized forms of vegetation, there is a uniformity among cryptogamic plants both in the northern and southern hemispheres and that this species is characterized by polymorphism (Ritter, 1817, p. 51). In connection with the geographic relationships of animals, Ritter mentions the work of Büffon, von Zimmermann, Blumenbach, Cuvier and Treviranus, although he reserves a direct acknowledgment for the comparative method to the work of Grafen von Hoffmansegg who he says by daily observations and comparisons in nature offers collections of facts in a systematic and geographical order (Ritter, 1817, p. 51). Ritter mentions other zoologists including Sömerring, but he mentions them in connection with archeological or fossil studies and he does not elaborate any theories or procedures which illustrate clearly the comparative method. This lack of a
clear elaboration of the comparative method in anatomical studies is surprising in view of his much quoted statement in the early part of the introduction (p. 21). There he speaks unambiguously about the similarity of comparative geography and comparative anatomy. But in the same place Ritter speaks also of a hypothetical physiological geography. Ritter's reference to comparative anatomy is probably used as an extension of this metaphor. He describes the term physiological geography as a bit too exotic.

A thorough review of the sources mentioned by Ritter in the entire introduction in the light of a knowledge of his early studies in preparation for the writing of the *Erdkunde* suggests that Ritter's study of geologic and botanic thinking, as evidenced very clearly in the period 1802-1806 in the preparation of his *Sechs Karten*, was the most influential source of his understanding of the comparative process as it was applied to science. In view of Ritter's repeatedly expressed interest in botany and in view of his repeated metaphorical use of botanic language in all his writings, it might also be suggested that his interest and experience in comparative anatomy was more modest than his interest in botany. In the period of his preparation of the introduction to the *Erdkunde*, Ritter attended lectures in Hausmann's geology and Schrader's botany. There is no mention of formal lectures in Blumenbach's natural history or comparative anatomy. There is little evidence to suggest that Ritter practised anatomical dissections. But Ritter's comparative geography was conceived as a physiological model in accordance with the physiological thinking of Blumenbach, Sömmering and Ebel. The unit of analysis for Ritter was an anthropogeographic unit which varied over space in accordance with variation in the general conditioning elements. It was the aim of his general comparative geography to examine how these underlying general elements expressed themselves in a variety of ways and therein to appreciate the individuality of cultures as variations on a general model.

The Reception of the *Erdkunde* in Germany
The first volume of the *Erdkunde* was completed in May 1817 and published in Berlin by Reimar. Ritter had the romantic hope that the Nicolaischen Buchhandlung where his brother worked would publish the book, but in 1816, before the work was completed, the owner Hofrath Partey rejected the work based on his reading of the completed introduction (Kramer, 1875, p. 241). He considered it as a contribution to *Naturphilosophie* and rejected it out of hand. Ritter was dismayed at this reception and approached several respected academic figures in Berlin for other opinions. He
gained the support of the historians Link and Weiß, as well as Savigny, Wolltmann and others who restored Ritter's badly shaken confidence. His brother Johannes recommended that he approach Reimar, who published the works of Schleiermacher and Niebuhrs, and Reimar agreed to publish the four volumes which Ritter planned to produce. By 1859, Reimar had published no fewer than nineteen volumes (Figure 8.2).

The reception of the *Erdkunde* in Germany in the period immediately after its publication in 1817 has more to say about how it was understood in its own time than reviews written by later generations of geographers who possessed a knowledge of Ritter's later wide-ranging and more speculative methodological utterances. The specific and detailed remarks of critical reviewers at this time say much about the way Ritter's efforts, aims and methodology were appraised by academicians of this period, although the educated public also showed great interest in the work. There was agreement by all that the work was well-written, well-researched and a significant new contribution to the geographic literature. It was described as a "preiswürdige Werk"--prize-worthy work, and as "...eines der wichtigsten in diesem Fache"--one of the most important in this discipline (Jena, 1821, p. 18). Elsewhere it was described as "meisterhaft "--masterly (Göttingen, 1818, p. 1067). The reviewer for *Hermes* observed that nowhere did he hear an expression of reproach except in minor matters, and everywhere he heard enthusiastic calls (Leipzig, 1819, pp. 235-6). The work was critically recognized as a new direction within the geographical compendium literature or what was referred to as "...noch wenig betretenem Wege,"--a still little travelled path, "neue Bahn"--a new path, or as "neue Ansicht"--a new view (Vienna, 1820, p. 175; Jena, 1820, p. 51). Within the geographical-historical literature, it was described as an unparalleled epoch-making work which stood without equal; or which surpassed all forerunners in "...Anordnung, Verarbeitung, Scharfsinn und Belesenheit"--structure, treatment, acumen, and erudition (Halle, 1819, p. 833; Göttingen, 1818, p. 1057).

The old view was *Staatskunde*--State Science, which proceeded according to state territories and was oriented to specific aims (bedingter Zweck). Many of these works were written for fleeting profit from the latest traveller's reports or were based

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17 In the preface to the second edition of the *Erdkunde* which was published in 1822, Ritter provides a useful list of reviews which he describes as instructive (Ritter, 1822, pp.xv-xvi). The reviews are identified in the text by the place and date of publication. The authors of these reviews are not in most cases named.
Figure 8.2
Directory to the *Erdkunde*, 1817 - 1859

<table>
<thead>
<tr>
<th>Volume</th>
<th>Subject</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Africa, Asia</td>
<td>1817; 2nd edition 1822</td>
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<tr>
<td>2</td>
<td>North and North East of High Asia</td>
<td>1818; 2nd edition 1832</td>
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<tr>
<td>3</td>
<td>Northeast and South of High Asia</td>
<td>1833</td>
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<tr>
<td>4</td>
<td>Southeast High Asia</td>
<td>1834</td>
</tr>
<tr>
<td>5</td>
<td>The Indian World I</td>
<td>1835</td>
</tr>
<tr>
<td>6</td>
<td>The Indian World II</td>
<td>1836</td>
</tr>
<tr>
<td>7</td>
<td>West Asia: Transition--East to West Asia</td>
<td>1837</td>
</tr>
<tr>
<td>8</td>
<td>The Iranian World I</td>
<td>1838</td>
</tr>
<tr>
<td>9</td>
<td>The Iranian World II</td>
<td>1840</td>
</tr>
<tr>
<td>10</td>
<td>Steplands of the Tigris-Euphrates System I</td>
<td>1843</td>
</tr>
<tr>
<td>11</td>
<td>Steplands of the Tigris Euphrates System II</td>
<td>1844</td>
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<tr>
<td>12</td>
<td>The Arabian Peninsula I</td>
<td>1846</td>
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<td>13</td>
<td>The Arabian Peninsula II</td>
<td>1847</td>
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<td>14</td>
<td>The Sinai Peninsula</td>
<td>1848</td>
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<tr>
<td>15</td>
<td>Palestine and Syria I/II</td>
<td>1850/1851</td>
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<td>16</td>
<td>Palestine and Syria III</td>
<td>1852</td>
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<tr>
<td>17</td>
<td>Syria I/II</td>
<td>1854/1855</td>
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<td>18</td>
<td>Middle East I</td>
<td>1858</td>
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<tr>
<td>19</td>
<td>Middle East II</td>
<td>1859</td>
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</tbody>
</table>

on existing texts whose contents were merely altered (Jena, 1820, pp. 49,51). While Ritter’s work was based also on travel reports and existing geographical texts, it was recognized immediately as something quite different in at least two respects. Firstly, Ritter’s work differed from the current literature by virtue of its deeper foundation in the critical examination and use of the accumulated mass of available knowledge--travel reports and geographic materials from all past ages (Jena, 1820, p. 49). The detailed bibliographic references were described as praiseworthy especially in a work that depended so heavily on the authority of its sources (Vienna, 1820, p. 185). Ritter’s research and recording of the results of two thousand years of study, from Herodotus to recent travel reports, was aptly portrayed as a "großartiger Zusammenhang"--superb interconnected [whole] which brought forth "überraschende Folgerungen"--surprising results, such as the plausible assertion of an interconnected highland mass in central Africa which no single observer had yet observed (Leipzig, 1819, p. 240).

Secondly, Ritter’s *Erdkunde* differed from traditional "politische Erdbeschreibung,"--political earth description, or from the so-called "Naturgeographien"--nature geographies, which were prevalent during the period of Napoleonic hegemony, because it was based on natural divisions of the earth in accordance with immutable laws (Weimar, 1819, p. 440). In 1817, natural division was not a new concept. But Ritter’s view rejected the new orthodoxy by rejecting natural divisions derived from the system of *Beckeneintheilung*--basin division, *Gebirgsnetzen*--mountain grids, etc., all of which ultimately found a basis in Bauche’s theory of "...fortlaufende Bergzüge und Wasserscheiden"--continuous mountain ranges and watersheds (Jena, 1820, p. 51). Ritter’s new departure was the subject of specific criticisms and suggestions about ways Ritter could improve his work (Jena, 1821, p. 14; Weimar, 1819, p. 184; Vienna, 1820, p. 191; see also support for Ritter’s rejection of Bauche, Leipzig, 1819, p. 239). Many critics were not yet willing to abandon the "watershed theory."

In addition to these two new departures, most agreed that Ritter’s work was to be understood not merely as an important advancement of geographical knowledge, but also an important contribution to history. It was considered in part as an auxiliary aid to the study of history or as an important newly structured aggregate source of information from which historians could extract useful information. The importance of this "wunderliche Aggregat"--amazing aggregate, of historical, geographical and
physical sciences, was in one critic’s opinion achieved by the efforts of a "neuer Baco"—a new Bacon (Halle, 1819, pp. 835, 844). The contributions to the obscure histories of the Central Asian highlands were recognized as noteworthy contributions to history proper (Göttingen, 1818. p. 1067).

In every instance, the scientific quality of the work was not disputed. Despite its great public appeal, it was referred to as an example of "rein wissenschaftlich"—pure science, and thereby only suitable for the "Eingeweihten der Wissenschaft"—those initiated to science (Weimar, 1819, p. 440). It was not merely a work to be read, but to be studied in depth (Halle, 1819, p. 836). And what Ritter had once said of Alexander von Humboldt—that in him could be found the knowledge of an academy combined with the sense of what lay at the base of all phenomena—was according to one reviewer also to be said of Ritter (Leipzig, 1819, p. 235). Because of his serious scholarship and love of science, Ritter was permitted by one of his sterner critics, to be counted among the "...echten Priestern der Wissenschaft"—genuine priests of science (Vienna, 1820, pp. 175-6). Perhaps most revealingly, Ritter’s publisher was repeatedly criticized. There was general agreement that a work of this stature deserved to be printed on higher quality paper (Leipzig, 1819, p. 245; Jena, 1821, p. 19).

The Nationalist Component

The work was also received as a noteworthy outgrowth and contribution to the reemergence and reassertion of the German nation. One reviewer who was moved in "volkshümlich Hinsicht,"—with respect to the folk-movement, understood Ritter’s work as a scientific expression of the general "...schönen Erhebung unseres deutschen Volkes..."—splendid rising of the German people (Leipzig, 1819, p. 235). Repeated references were made to the enormous industry that went into the work which was characterized again and again as a generally recognized and peculiarly "deutscher Fleiß"—German industry (Göttingen, 1818, p. 1957; Weimar, 1819. p. 190; Vienna, 1820, p. 213). In a more overtly chauvinistic way, the work was contrasted with Malte Brun’s *Précis* and described as surpassing this geographic work both in detail of knowledge as well as in general erudition; it therefore elevated the German work "...weit über das Französische..."—far above the French (Weimar, 1819, p. 190).

Such overt nationalist appreciation of the work led to chastisement of Ritter’s adoption of non-German words into the text—a critical theme which can be traced back
to early eighteenth-century attempts to establish German as a legitimate scholarly language. For example, the use of the word "grandios" which is described as "hochklingende"—high sounding, or the repeated use of the word "configuration" led one critic to remind Ritter that he could achieve "Klarheit"—clarity, if he spoke to his readers in their own language (Jena, 1821, p. 18). Ritter's use of the term "Erdindividuum" was criticized as unnecessary since the well-established term "Erdtheil" already existed. The critic did not wish to reproach Ritter for his use of a non-German term, but its "undeutscher" character was noted (Vienna, 1820, p. 190).

Another critic openly declared that the title of Ritter's work could be improved if he omitted the second half which was considered superfluous. The first half (i.e. Die Erdkunde im Verhältniß zur Natur und zur Geschichte des Menschen) was described as "...kürzer, deutscher und deutlicher..."—shorter, more German and more distinct (Leipzig, 1819, p. 236).

These nationalist inspired reprimands are interesting in and of themselves, but they provide also a valuable introduction to the much discussed problem of interpreting Ritter's language generally. In its own time, there were complaints against Ritter's diction—specifically a lack of "Klarheit"—clarity, in individual passages (Halle, 1819, p. 836). The language criticisms were part of a general critique of the mode of presenting the work. Ritter's language was understood as consisting of two kinds. Firstly there was a descriptive mode which was praised as simple and clear; secondly, there was a philosophic mode which was at times obscure, hard to decipher and had a strenuous lack of full-stops (Jena, 1821, pp. 17-18). Overall, the language was a bit too sanguine and led one reviewer to use a mocking tone in his criticisms (Vienna, 1820, p. 179). This was especially true of the introduction which was considered to have been written in accordance with the style of the times, which shrouded generally understood concepts in obscure philosophical sounding expressions (Ibid., 1820, p. 177). But such ponderous expressions were also charitably attributed to a rich but less-practised intellect (Leipzig, 1819, p. 236). Such indeterminedness was also observed in the title. One critic observed that neither the intended scope of the work, nor the precise meaning of the word "Verhältniß"—relation, was clear, but despite this defect and the other instances of vagueness in the introduction, the idea of the work was in general "deutlich"—intelligible (Vienna, 1820, pp. 177-78). This critic, along with others, quotes from Ritter's preface what was understood as the main aim of the work which was an attempt:
...die allgemein wichtigsten, geographisch-physikalischen Verhältnisse der Erdoberfläche in ihrem Naturzusammenhange, und zwar ihren wesentlichen Zügen und Hauptumrissen nach darzustellen; insbesondere als Vaterland der Völker, in dessen mannigfaltigstem Einflusse auf körperlich und geistig sich entwickelnde Menschheit (sic) (Ritter as quoted in: Vienna, 1820, p. 177; Halle, 1819, p. 834; Jena, 1820, p. 49).18

Teleology and Methodology

In most reviews, there is little concern about the so-called teleological element in Ritter's work insofar as it concerns the earth as the preparatory ground for human development. Ritter's reference to the "blinde Streben"—blind striving, of humanity, and the quest for "Klarheit"—clearness and "Wahrheit"—truth in sensual nature, which leads to the idea (Ahnung) of the divine, was referred to by one reviewer as so general that it could have been included in the introduction to almost any work (Vienna, 1820, p. 177). Ritter's high sounding aims, philosophy and methodological statements were subjected to an extensive critique by the reviewer for the Vienna-based Jahrbücher der Literatur identified by his surname Rhode (presumably the Berlin-based military geographer J.G. Rhode). Ritter was criticized for believing that in an earlier period of history, mankind shared with nature a more intimate and understanding relationship where both stood next to one another as two "gleich geschaffne Seelen"—equally created souls. Ritter's critic wrote that he had nothing against such "unschuldigen Glauben"—innocent beliefs, provided that they were not contemplated as foundations for historical research and deductions (Vienna, 1820, p. 180). The critic suggests that the grandiose aims of Ritter's introduction, his desire to understand the inner workings of nature were derived from a belief that this lost intimacy could be regained. Rhode found this objectionable. After all, as the critic rhetorically asks, who is capable of achieving this level of insight, and how long will it take to achieve if we must confine ourselves to advancing from observation to observation (Vienna, 1820, p. 181). It is true that Ritter entertained a great optimism for humanity, but as repeatedly observed, his goals were established as an aim to direct man's strivings, not as aims which could actually be achieved in any complete way. Rhode's complaint against Ritter was an isolated complaint which is interesting only because it sets the

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18"...to present the general most important geographico-physico relationships of the earth's surface in their natural interconnection, and to present them in their essential characteristics and main outlines; especially as the fatherland in the great variety of its influence on the corporeal and intellectual development of humanity."
tone and provides a point of departure for the remaining critique which is more substantial. The critique itself has flaws, but the substance of the critique is of great heuristic value.

Rhode is critical especially of Ritter’s discussion of the existence of an "idealer Hintergrund"—ideal background, which he says Ritter misunderstands. Ritter says such an ideal background is necessary in order to be able to bring forth a whole. He identifies this as the "Grundidee"—conceptual basis of his study. The existence of such an ideal background is described by Ritter as theoretical and ultimately a question of belief. Ritter further describes the system, as one which is derived from two conversations with a great man of the century (i.e. Pestalozzi, see Ritter, 1817, pp. 22-3). Ritter clearly has in mind the theory of *a priori* inner cognitions (innere Anschauungen)—which form the essential images upon which all cognitive synthesis is based.

Rhode apparently does not understand it in this way, or is perhaps confused by the Leibnizian *a priori* character of Ritter’s conception. Rhode argues that the "Grundidee" of each system of science can only be constructed from concepts based upon experience (Vienna, 1820, p. 182). He argues that such systems are developed and perfected by "...fortgesetzte, vergleichende Beobachtungen der Erscheinungen"—continuous comparative observations of phenomena, which bring forth an ordering of those phenomena. What Rhode fails to recognize, or perhaps what Ritter fails to state unambiguously is that his "Grundidee" is not the unique unifying principle of his own science of geography, but is the basis for the intellectual process which lies at the root of the possibility of any science. It is the psychological structure which makes possible the synthetic operation of the mind—an operation which Rhode himself recognizes as the inductive process of continuous comparative refinement. Rhode asked how this ideal background might be constructed, as if it were a theoretical system for a particular science. Ritter’s ideal background cannot be constructed: it exists *a priori*. Those ideas or essential forms which Ritter seeks to derive from continuous comparative induction already exist obscurely in consciousness. The comparative faculty of mind lifts this obscurity and produces clear and distinct ideas.

Rhode’s critique is extended to reveal certain apparent contradictions in Ritter’s "Allgemeine Vorbemerkungen"—General Preliminary Remarks, which the reviewer
considers to be the actual (eigentliche) introduction to the real (wirkliche) geography (Vienna, 1820, p. 185). The main contradiction he finds is in Ritter's wish to apply the individual sciences in the *Erdkunde* without the necessity of understanding the details of the constituent theories of these sciences. Ritter is indeed ambiguous. Specifically, Rhode wonders how such knowledge can be ignored if one wishes to write a "comparative geography." How can the author wish to show what mankind’s physical and intellectual individuality, as expressed above all in nation-states (Staatsvereine), owes to climate and the structure and position of its fatherland without delving into physics, chemistry or physiology (Vienna, 1820, p. 189). If Ritter's ambiguous meanings are lost on Rhode, the concept of his comparative geography is not. The concept of comparative geography which is implicit in Rhode’s critique—that is a geography which seeks to examine recurring man-land (Volk-Vaterland) units as physiological units, explaining their individual peculiarities by examining their dependence on different mixes or assemblages of determining elements which vary according to location—is quite consistent with the concept of comparison in the sciences in general.

A more explicit critique of Ritter's use of comparison, is linked to his choice for beginning his study with Africa. This choice arose from Ritter's repeated insistence that study should proceed from the simple to the complex. For Ritter, Africa was the simplest of continental forms because of the uniformity he found in its various features. Ritter's Jena-based critic(s) who is(are) only identified by the initials W.u.F., argues that Asia appeared to be a more suitable beginning for a comparative geography because in the centre of Asia the forms of animate and inanimate nature, that is, all phenomena in general, have reached their most consummate forms. Therefore where such phenomena recur in less perfect form, the better they can be indicated in accordance with the comparative method:

...vielmehr scheint uns Asien vor allem geeignet, die große Reihe zu eröffnen, weil in dessen Centrum die Plateau- und Terrassen-Bildung am klarsten hervortritt, und eben hier, wo die verschiedenartigsten Bildungen in der belebten und leblosen Natur sich darbieten, auch sogleich alle Erscheinungen in ihrer größten Vollendung hervor treten, und dann, wo diese minder vollkommen wiederkehren,
The concept implicit here is a virtual analytic application of the comparative method. Instead of inductively deriving ideal forms, it is suggested that Ritter should have begun with such forms as they were postulated to exist in Asia and should have looked for deviations, or perhaps degenerations. In its time this was not an exotic suggestion, but one whose history may be traced to Herder who made similar physical anthropological assertions concerning Asia. At the least, Ritter’s comparative geography was understood by scientists as incorporating ideal forms. But there was recognition too that Ritter sought to employ the comparative method empirically and scientifically to derive and refine these essential forms.

**Ritter’s Rejection of Watershed Theory**

In addition to criticisms of Ritter’s philosophical and methodological assertions, reviewers complained about his rejection of those systems of natural division which were based on Bauche’s, Gatterrer’s and Schulz’s theories of the global interconnectedness of highlands. In contrast to this theory, Ritter offered what was understood to be another equally hypothetical system where each continent drew its character from an isolated, centrally located, contiguous highland that acted as a structural support (Stütze) for the whole. His subordinate divisions included the steppe-lands (Stufenländer)—a transitional zone whose rivers descended into the plains (Flachlande). Ritter also created a seemingly *ad hoc* category to include mountain areas not linked to the central continental highland. He called these separated mountain complexes (getrennte Gebirsglieder).

According to one reviewer this method of ordering was awkward at times. Specifically, the length of the discourse from the point of departure until its return was so long that the spatial interconnectedness of the continent was lost from view (Jena, 1820, p. 58). In his discussion of Asia, especially the Tigris-Euphrates area, the

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19"...rather Asia appears to us above all to be the most suitable to begin the series, because in the center of Asia the plateau and terrace formations stand out the most clearly, and it is here also where the greatest variety of forms in animate and inanimate nature present themselves and where too all phenomena arise in their greatest perfection. And then where these recur less perfectly, the better this can be indicated in accordance with the comparative method."
reviewer complains that there were unexpected leaps between regions. Likewise in the transition area between Europe and Asia, Ritter was accused of taking refuge in a purely imaginary geometric division—a triangle based on the Caspian-Black Sea area, the Mediterranean and the Armenian Highlands. Ritter's system worked in some instances, but in others it was only hypothetical (Jena, 1820, pp. 13-14). Elsewhere it was suggested that Ritter would have been more understandable (deutlich) and would have avoided many repetitions if the divisions of the continent had been placed in an introduction or a general panoramic view of the natural whole. This would have brought the natural earth descriptions into harmony (Einklang) with the political descriptions by permitting the subsequent dissection of individual parts. This critic did not suggest that Ritter's ordering was inherently wrong, but rather unappealing (Weimar, 1819, p. 184). But it was remarked later that Ritter's treatment of the Atlas Mountains in northwest Africa as a separated mountain complex was flawed. The Atlas, it was argued, was linked to the central highlands of Africa through the intermediate links of the mountain ranges of the Nile and Ethiopia (Weimar, 1819, p. 188). Elsewhere it was explicitly and bluntly stated that Ritter failed to realize the advantages of the "watershed net" division because his understanding of the theory did not correctly distinguish between the use of absolute and relative heights as had the most recent, especially military geographers (Vienna, 1820, pp. 191-3). Ritter's system of division was criticized also for failing to provide precise definitions and quantitative measures for distinguishing between his natural physiographic regimes (Vienna, 1820, p. 197). This deficiency in terminology was also observed by others (Halle, 1819, p. 840). The critique of Ritter's division was extended to include a demonstration of the superiority of description based on watersheds and suggestions for quantitative measures for distinguishing between various highland and lowland relief types.

Like most of the other reviews, the Weimar critique concludes with a section enumerating the many minor errors of facts and omissions which speckle the text. These exhaustive explorations and enumerations of minutiae are indicative of the thoroughness of the reviews Ritter received. These detailed reviews can perhaps be considered both as proof of, and as a lasting testament to, the existence in the early nineteenth century of a peculiarly "deutsche Fleiße" (Weimar, 1819, pp. 184-190). There was also a general expectation of a second edition where all these errors would be corrected.
All reviewers expressed their wish that Ritter be granted the energy and leisure to complete at least the immediate task of the *Erdkunde*—his studies of Asia and Europe. One reviewer looked forward especially to his study of Europe where he would be able to work with familiar materials. Ritter's lesser known book the *Die Vorhalle europäischer Völkergeschichten vor Herodotus, um den Kaukasus und an den Gestaden des Pontus*—Prolegomena to a History of Peoples of Europe before Herodotus around the Caucasus Region and the Shores of Pontus, 1819, was understood as the transition piece which would link the two continents together by a comparative analysis of ancient literatures and religions to establish the early contacts and migrations between Asia and Europe (Halle, 1819, p. 840). The scale of the undertaking was also recognized and it was doubted whether the task could really be accomplished in four volumes (Ibid., p. 840). It was suggested elsewhere that the first two volumes were as a whole, too structured and overelaborate. The work was not developed like a tree, but rather mechanically like a building. It would have been better perhaps if Ritter had only presented the results of such deep and thorough researches. In this way, the work could have been reduced in size by half (Jena, 1821, pp. 15-17).

It is probably true that such summarization would have brought to light a completed universal geography at the hand of Ritter, but from Ritter's viewpoint it would have been a compromised geography and one which of necessity would have failed to reveal and make accessible the rich resources which were an important part of the work. The compilation of what were considered to be rare and costly materials was recognized as a service in and of itself. The work was considered to be a self-contained library (Göttingen, 1818, p. 1066; Vienna, 1820, p. 213). But if the *Erdkunde* was in at least one fundamental way understood by Ritter as only a human striving, then it was assured of a place among the general literary strivings of German romantic authors who brought forth unabashedly all types of literary fragments. For in romantic literature it was the idea and performance of the task which comprised essential artistic fulfilment, and for Ritter, geographic contemplation was one of the highest forms of art.
The forty years of Ritter’s life following the publication of the first two volumes of the *Erdkunde* in 1817 and 1818, were enormously productive and important for the establishment of Geography as an academic discipline in Germany. Time and space prevent thorough consideration of this period in this thesis, but a sketch of Ritter’s life and work from 1817 to 1859 provides a means of offering a few reflections on his contribution to the advancement of geography and an agenda for further research.

Ritter’s transition from an independent scholar in Göttingen to a professor in Berlin is of particular interest, for it is in these years that Ritter decisively turned from a career as a pedagogic theorist and began his career as a professional geographer (Figure Epilogue.1).

In early 1817, while attending to the business of final revision and publication of the first volume of the *Erdkunde*, Ritter met many influential people in Berlin. For Ritter’s future, the most important of these include the statesman von Savigny whom Ritter met through his former student August Bethmann-Hollweg who was now working in Berlin. He also met General von Wollzogen, an influential member of the Prussian military establishment. Even before the publication of Ritter’s book, there was discussion that Ritter should be brought to Berlin to teach in the cadet academy of the Königlichen Allgemeinen Kriegsschule--Royal General War College (Kramer, 1875, p. 246). Ritter wrote that he had an inclination to work for Prussia, but at this time he had many other options to consider (Ibid., p. 257). In addition to offers from gymnasium in Bremen and Weimar, Ritter was offered positions as Professor at Bonn University which was soon to be opened and as Professor of History and Geography in Frankfurt-am-Main where he still had many friends. There was discussion about finding him a place in Göttingen, but Heeren and Blumenbach did not support the scheme (Ibid., p. 261). Ritter was also invited by Pestalozzi to take over the directorship of the Pestalozzi Institute in Yverdon, but Ritter did not feel prepared for a directorship and preferred to work for the benefit of his own fatherland (Ibid., p. 256). In late 1818, Ritter’s inclinations and friendships drew him toward Frankfurt where he accepted the professorial position despite his fear that he would have little time to continue the *Erdkunde* or embark on other projects within his area of speciality. In 1819, Ritter married Lilli Kramer, the sister of Ritter’s biographer.

Source: Hanno Beck, 1979
Gustav Kramer. Ritter was continually concerned that his position should be financially stable and reasonably comfortable.

As Ritter feared, teaching in Frankfurt consumed most of his time and energy and he had to limit his social contact in order to complete his Vorhalle-Prolegomena. This lesser known work aroused considerable discussion and debate and attracted the attention of Freiherr von Stein who is reported to have devoured the work (Kramer, 1875, p. 299). The comparative philologist Wilhelm von Humboldt was also very interested in the work and began correspondence with Ritter. Both von Stein and von Humboldt exercised great influence in Berlin’s academic world. By this time the Erdkunde had also been reviewed and widely appreciated as an important new contribution to science. Friedrich von Schlegel called it the "Bibel der Geographie"--Bible of Geography (Kramer, 1875, p. 272). New efforts were made by von Savigny, von Wollzogen and Wilhelm von Humboldt to bring Ritter to Berlin. At the end of October, 1819, Ritter was asked by von Wollzogen in consultation with von Altenstein and the Minister of Defense, if he would come to Berlin and take up a joint appointment to the Kriegsschule and the University of Berlin. To supplement the limited income that was offered (1000 Taler), Ritter would be provided with free housing. Von Savigny let it be understood too that Ritter would be elected to the Prussian Academy of Science and would receive a supplement to his income from this organization. Ritter who was dissatisfied with his position in Frankfurt and wished to work exclusively in his geographic speciality had little difficulty in making the decision, or as Ritter explained:

...also was kann ich menschlicher Weise anders wollen, als Ja sage; es ist ja weit mehr, als ich in meinem Leben gewollt habe, oder worauf ich hätte Anspruch machen können (Ritter, 1819 in Kramer, p. 301).¹

Around the end of November 1819, Ritter received an official offer from Ministers von Altenstein and von Boyen. Attempts were made in Frankfurt to keep Ritter by improving his teaching and financial situation, but Ritter’s decision to move to Berlin was final.

¹"...in human respects what could I wish to say other than yes. It is much more than I had ever wished in my life, or could make a claim to."
Ritter had a wide ranging impact and was very influential in the establishment of geography as an academic discipline in Berlin in his role as administrator, researcher and teacher. He began his teaching duties at the military academy and the university in 1820. In 1822 he was elected a full member of the Prussian Academy of Science. He was formally named Professor of Regional Geography, Ethnology and History in 1825 and helped found the Gesellschaft für Erdkunde zu Berlin—Society for Earth Science in Berlin, in 1828. He served as its first president. Ritter's teaching and administrative responsibilities in the war college and the university were so demanding that he did not substantially advance the *Erdkunde* until 1832 when the burden of his administrative responsibilities was lightened. The years from 1820 to 1832 were not unproductive for his research. He revised and reworked the first two volumes of the *Erdkunde* and produced regional monographs on Arabia (1826) and India (1829). He also contributed several short works describing the results of various explorations and read papers before the Academy of Science including an important methodological paper in 1828 which was published in 1831. He collaborated with F.A. O’Etzel on an atlas of Africa.

In 1834, Ritter began a series of travels which continued until 1851 when he was in his early seventies. In this period he travelled throughout Europe. In 1837-38, he spent time in southeast Europe and travelled as far east as Constantinople. In 1840, he travelled through Scandinavia and in 1841 he visited England, Scotland and Ireland where he explored the Giant’s Causeway. Ritter made repeated visits to different parts of central Europe beginning in 1843 and including Vienna, the eastern Alps, Galicia, Hungary and Bohemia. In 1845, he travelled in France and the Pyrenees. His travel diaries which are preserved in the Klopstock Museum in Quedlinburg reveal his proficiency in careful field observation. It would be interesting to compare these travel observations with the method of observation promoted by Blumenbach. It is unfortunate that Ritter did not produce at least one volume on Europe so as to reveal his plan for integrating his own travel descriptions alongside the explorers of the past.

In this same period Ritter contributed many reviews and articles to the journal *Monatsberichte über die Verhandlungen der Gesellschaft für Erdkunde*—Monthly Report of Transactions of the Society for Earth Science, which was founded in 1839 and was the forerunner of the *Zeitschrift für allgemeine Erdkunde*—Journal for General Earth
Science. He pursued his interest in classical studies as a member of the historical-philological section of the Prussian Academy of Science, where he gave a series of lectures on obscure and little known subjects. Some of these lectures were published in the *Abhandlungen der Akademie*--Treatises of the Academy, and extracts appeared in *Berichte über die zur Bekanntmachung geeigneten Verhandlungen der Akademie*--Reports Announcing Pertinent Transactions of the Academy (Linke, 1981, p. 101). He continued to present methodological papers to the academy which were published as a collection by Daniel in 1852 and translated into English in 1863 as *Geographical Studies of the Late Professor Carl Ritter of Berlin*. These papers reveal the continual development of his methodological and theoretical ideas. An important new influence in Ritter's later thinking was Heinrich Steffens' *Anthropologie* published in 1822. Ritter was productive up until the time of his death in 1859. In 1856 he retired from teaching duties and acted as curator of maps for the Royal Map Library. In the last year of his life, the sharpness of his mind had not diminished and he was appointed as the librarian for the library. Throughout his life, the compilation and production of maps were a source of both vocation and avocation.

Ritter's research throughout his later years remained focused on the compilation of materials and production of new volumes for the *Erdkunde*. Unlike Alexander von Humboldt who could work at leisure, Ritter's numerous responsibilities limited the time he could devote to mastering the ever increasing amount of information that was generated by travel and exploration. The *Erdkunde* remained incomplete confined to an increasingly detailed examination of Asia culminating in the Middle East and the Holy Land. The volumes on Europe were never forthcoming although Ritter's lectures about Europe were eventually published after his death in 1863. Ritter found time to prepare numerous papers on incidental geographic topics. An evaluation of these later works and especially the *Erdkunde* itself is necessary for a complete understanding of the method and intent of Ritter's general comparative geography as Hanno Beck has skilfully demonstrated (Beck, 1979, pp. 78-110).

The failure to complete the *Erdkunde* was a failure to complete Ritter's methodological plan. A final systematic synthesis of his regional studies was never forthcoming and the work was therefore never subjected to final comparative analysis. In this context it is also necessary to examine critically how the work was understood by the subsequent generation of geographers who attempted to employ his method. As
noted in the introductory chapter, Plewe listed the numerous ways it was understood in Ritter’s own time. The list provides an excellent point of departure for further investigation, but of particular interest is the history and content of the short-lived *Zeitschrift für vergleichende Erdkunde—Journal for General Comparative Geography*, published in Magdeburg from 1842-1850. In this journal edited by J.G. Lüdde, German geographers attempted to employ Ritter’s general comparative method with varying success.

As a teacher Ritter was very successful. His engaging lecture style attracted up to 400 students at a time including many foreign students. Among these are the French geographer Elisée Reclus, the Russian geographer Semenov-Tiam-Shansky, and the Swiss Arnold Guyot who propagated Ritter’s thinking in the United States. Ritter’s German students included the geographers Heinrich Kiepert, Heinrich Berghaus, Heinrich Barth, J.E. Wappäus and Ernst Kapp. There is also a direct connection between Ritter’s thinking and Friedrich Ratzel who acknowledged the great debt that his *Anthropogeographie* owed to Ritter as J. Steinmetzler has carefully traced (Steinmetzler, 1956; Hunter, 1983, pp. 355-58). These intermediaries include: Moritz Wagner who knew Ritter personally and was inspired by his *Vorhalle—Prolegomena*; Ritter’s student Ernst Kapp who developed Ritter’s comparative thinking in his *Vergleichende allgemeine Erdkunde in wissenschaftlicher Darstellung—Comparative General Earth Science in Scientific Presentation*; and J.G. Kohl who was interested in trade and human settlement patterns. Ritter was also influential in the training of several generations of Prussian military officers from 1820 when he was appointed to Clausewitz’s cadet academy. Ritter’s effect through all these individuals is worthy of careful re-examination as is the dissemination of his ideas outside Germany.

**Agenda for Further Research**

Much remains to be examined in Ritter’s early years. Especially intriguing is the relationship between von Humboldt and Ritter in 1807. Little is known about von Humboldt’s earliest study and training at the Freiburg Academy of Mines in the early 1790s or the published correspondence and works which arose from his scientific trips through Germany with Freiesleben and von Buch. This period of training was fundamental to all his later work and there is still much unworked material scattered in the numerous scientific journals of the time. If one scientific origin of Ritter’s comparative geography is to be revealed, it lies embedded within this material.
is also more that can be done to reveal the mutual influence of Ritter and von Humboldt in 1807. Despite von Humboldt’s status as a nobleman, world famous traveller, and accomplished scientist, there are ideas unique to Ritter which may have found expression in von Humboldt’s own developing concept of geography.

The most engrossing aspect of this episode is Ritter’s subsequent production of a manuscript which undoubtedly bears the imprint of von Humboldt’s thinking. A careful consideration of the issues identified by Schmitthenner (1951), Plewe (1959) and Engelmann (1981) might be advanced by a detailed analysis of Henning’s life and work and his geography textbook which adopts portions of Ritter’s manuscript. A single copy of the textbook is found in Munich and several copies are known to exist in the Pestalozzi Archives in Switzerland. Careful comparison of this work with Ritter’s *Erskunde* and with Ritter’s earlier exhortations about geography may permit a better understanding of Ritter’s thinking in this transitional period of his intellectual development. But this remains an unsatisfactory substitute for Ritter’s manuscript. In 1989, Hanno Beck confirmed that the manuscript had not yet been found, but is convinced that it might be found by an intensive search (Beck, 1989). The librarians in the Ritter archives in Freiburg, Quedlinburg and Schnepfenthal have no record of the manuscript. The lost manuscript leaves a painful gap in the understanding of Ritter’s early intellectual development.

A new modern biography of Ritter would be a welcome addition to the understanding of the motivating forces of Ritter’s geography. In addition to historical forces that are linked here to the rise of German nationalism, many other factors are linked to the unique circumstances of Ritter’s life. In many ways, the first thirty years of Ritter’s life were directed and controlled by a series of patriarchal figures who acted in the place of Ritter’s early deceased father. It was not until the death of Bethmann-Hollweg in 1808 that this chain was broken and Ritter began to shape actively his own destiny. Ritter’s lifetime commitment to Christian philanthropic principles is also important for understanding an individual who played an active role in the development of the rational enlightenment. In his early years, Ritter repeatedly subordinated his own ephemeral desires to preparing himself as an effective servant of humanity. The early deaths of both parents and several friends led Ritter to remark that man certainly was not placed on this earth for his own happiness (Ritter, 1800 in Kramer, p. 72). This was a pietistic remark which stood in stark contrast to the
happiness principle of the enlightenment. The understanding of Ritter’s theologic and metaphysical thinking could also be furthered by investigating the abstruse elements of Schelling’s philosophy. These are all themes which I hope to develop in a work which covers Ritter’s entire life.

There are perhaps a few lessons from Ritter’s practise of science that remain pertinent today despite the enormous advances which have been made in our understanding of the physical earth and the social processes of its civilizations. Foremost among these is Ritter’s use of philological analysis in order to understand the outlook and knowledge of authors from different cultures and different periods of history. Ritter’s understanding of the cultural relativity of knowledge, perhaps derived from Herder, was fundamental to his careful adoption of useful facts from outmoded texts. In his Vorhalle—Prolegomena, he adopts explicitly comparative linguistics to trace the earliest linkages between Asia and Europe by comparing languages, myths and religions. This procedure is of lasting value to the historical geographer in reconstructing past geographies. In a similar way, literary criticism might justifiably claim a place in the provision of geographic facts by subjecting descriptive passages of non-geographic texts to the same type of careful analysis. Ritter’s philological analysis is as valid today as it was innovative in the late-eighteenth and early-nineteenth centuries. It forms an important part of this attempt to understand and explain Ritter’s early thinking by providing a means of linguistically identifying individuals who read the same literature and adopted the same ideas.

A second and perhaps more ponderous lesson is linked to Ritter’s adoption of theories from eighteenth-century empirical and rational psychology. The most fascinating ingredient to Ritter’s concept of geographic science was his belief that the structure of science should be compatible with the structure of our consciousness. This was linked through Ritter’s holism to an a priori belief in the parallel structure of mind and nature. If it is conceded that science is an outgrowth of mind, and that science and mind are systematic and structured, then it is not easy to dismiss Ritter’s less assuming premise that the most efficacious organisation of a science is one which is compatible with the process and structure of human thought. The state of human psychology and associated philosophies of knowledge today is much advanced over the highly mechanistic models offered by Kant and others in the late eighteenth-century,
but it would be highly satisfying if, like Ritter, geographers could establish a system of geographic science which was not only compatible with the structure of human thought, but also extracted from the phenomenal world, the requisite materials for the further development of humankind.
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267
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268


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302
Appendix I

Translation of the preface to *Europa, ein geographisches-historisch-
statistisches Gemälde*. Volume 1, 1804.\(^1\)

To the reader.

Educated youth, teachers and all friends of Earth Description: I proceed to the first part of this picture of Europe in the hope that its content instructs you and that more is acquired for a science to which we owe so much important knowledge of the Earth and its population. I lay before you the treatment of part of Europe, and feel compelled in respect to its goal, its method, and its usefulness as an auxiliary aid to mention but a few, to show that it was not my intent to enlarge aimlessly the great number of existing books with another similar one.

My work was conceived for the educated public of whom I could assume basic geographic knowledge, or a facility for acquiring a bit of knowledge about the details and topography of a country from the usual general handbooks. My aim was to elevate the reader to a vivid view of the entire country, its natural and man-made products, its cultural and natural world, and to conceptualize all of these as an interconnected whole so as to develop from nature and mankind, especially by mutual comparisons, the most important results concerning the same. This could only be achieved if I presented insofar as possible the individual phenomenon in a serious-minded and concise language and always within the view of the whole. Therefore, the presentation is not delivered merely as general remarks, but rather as a series of facts and portrayals that bear the characteristic imprint of their subject and are presented in their intellectual connection. In this regard, I flatter myself for having given geography teachers much material for instruction in this science, and for giving the dilettante a condensed march through the best and most essential of the many recent natural historical or geographical works, including travel descriptions whose acquisition are too costly or too time-consuming to read. Consequently, the language is succinct, often abrupt, and the print is very crowded in order to avoid the problem of length. The preparation of this book was brought about by the need of instruction itself.

\(^{1}\)Italics indicate words with special logical meanings in eighteenth-century pedagogic theory.
In this regard, my main intention was cultivation of the mind and not just collection for the sake of memory. I sought to bring everything as much as possible in connection and present cause and effect. I sought to make Geography pragmatic if I permit myself to employ the expression. The Earth and its inhabitants stand in the most exact interconnection and one part cannot be represented in all its relationships without the other. Accordingly, History and Geography must remain inseparable companions. The country influences the inhabitant, and the inhabitant the country. Therefore, the geography of each empire is preceded by an historical introduction that shows us in abbreviated form, how it developed in accordance with the people and the state, and how it reproduced prevailing relationships. In every case, it provides us with the measure for assessing what to expect in the present condition of the people and the country. It should show what the country owes to its people. It presents cultural history only and handles political history only insofar as it has influence on the development of the state and form of government, on which in turn, so much depends. It is then easy to show also what nature did for the people. Unfortunately, our cultural history is not developed to any high degree of completion, and has been handled only fragmentarily. Therefore my treatment here and there is probably a bit thin. But elucidated better are the many branches of natural history and physical geography. It appears to me that heretofore the important influence of natural conditions have been handled too lightly and superficially in previous geographies. I made it my task to give special attention to showing these influences. Just as chronology is the basis of history, without whose help all facts are confused, it appears to me equally necessary that physical conditions be the basis of geography, in space like the former is in time. It is the skeleton around which everything else is only flesh and muscle. It gives the entire interconnected whole and each of its parts, its own peculiar character and life.

Now we are able to see what together nature and art (i.e. human effort), brings forth--products. Human livelihood is the source of all activity and human possessions almost the single aim of all striving. Therefore it merits exact description. It sets manufactures, all types of businesses and trade in motion. The detail of these subjects is so diverse, that it lends itself to numerical summary under certain principle headings that alone are in position to establish results. Here we use the method of statistics. The presentation of business and trade returns us again to man, that is, to the main subject of our efforts. We consider him first in his physical circumstances, then in his moral and intellectual circumstances, and then in that which these specifically bring forth--religion, education, government. Finally we turn to his social union, as a citizen or servant of a state, then to the state itself and conclude this interconnecting whole with the power which the state possesses to maintain itself, its existence and survival in the most adverse
circumstances. In order to give the easiest overview of the cultural situation of each empire, city tables are appended. The city tables are entirely new and complete because they appeared to be required for this purpose.

Where I deviate somewhat from this method, this was due to other circumstances, such as a scarcity of relevant material, and to the hesitancy to offer uncertain judgment. Where I violate this plan entirely, it occurs against my will. By reason of this disorder and presentation, I gave to the book, perhaps somewhat presumptuously, the title: »Pictures« perhaps it should be called more modestly only »Portrayal« but this latter is not consistent with my aims. A consistent set of auxiliary aids are not available to me throughout, despite the broad range of exceptionally useful and occasionally very new materials. I flatter myself to have communicated to my reader the best information and every now and then something new that is still not included in other general geographical works. For each empire I sought to lay the foundation with the best geographic work. Furthermore, I used repeatedly the author's own words when I was not in the position to better reiterate what had been said. I want briefly to indicate the main sources that I made particular use of for each empire, in order to name and thank my authorities. I wish also to make known some useful writings to the dilettante who wishes to penetrate deeper into the knowledge of countries. [Translator's note: these sources have been moved to the end of the preface].

To friends who kindly assisted me in this work with their own materials, I give here the warmest thanks. To the reader I request patience in the sections which do not accord with expectations. And to the reviewer I ask for a rigorous but fair, instructive, and considerate criticism, of this first attempt that is not yet consistent with my intentions. The second part of this work will include the southern part of Europe to the east. It appears Easter 1805. The third part will deal with western Europe. The entire work should result in an index. I have chosen the heretofore peaceful north for the first part. It is not yet definite when Germany will come to rest and permit itself to be portrayed. It is not included in the three parts. Of course there is no lack of useful works on this part of Europe and there is too little space here for a history of this country. I have not given a general introduction because I am of the conviction that what one usually cares to give to the educated reader can be developed more vividly, uniquely, and distinctly at the close than by general remarks in the beginning. The general results that could be developed here provide material for the preparation of a work that in part (that which concerns mankind) is found already in a broad and expanded plan by D. Jenisch in his Geist und Character des XVIII. Jahrhunderts, Berlin, 1800. He has excellently presented the material.
with philosophic spirit, acumen and flourishing inventiveness. In view of the general results from the natural historical, physical and geographical parts, I direct your attention to a series of maps which should appear soon under the title: "Tafel der Culturgewäsche von Europa, geographisch nach Climaten dargestellt, nebst einen Bogen Text" and is to be had in the bookshop of the educational institution in Schnepfenthal. Its exterior is stylishly arranged; whether the plan of its contents satisfies the purpose that I sought, and whether it is appropriate for school instruction, I must leave to the opinion of the educated public to decide.

Frankfurt-am-Main
April 1804
C. Ritter, Educator

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The article "Contributions to a Better and Appropriate Method for Geographic Instruction" by Mr Linder, that I found in the April edition of the Zeitschrift für Pädagogik, p. 265, is well worth reading, but compells me to communicate some different ideas about this same subject. The subject appears to me to be of sufficient importance as to warrant a more exact and serious examination. The author of that article himself invites comment on his method and I hazard to state my viewpoint that brings to hand a wider scope for the treatment of this science. I likewise request criticism.

It is indisputably very true that geography is to be considered as part of instruction, but still one finds no general agreement about the method of its instruction. This is observed readily in the overwhelming number of cursory views here as in so many other subjects. Often much good is contained, but in many respects these views are not satisfying to the thoughtful teacher. It is also true, as Linder remarks, that there is almost no science which does not take a bridge-piece from geography. In geography are interlaced: mathematics, natural history, technology, history, human and ethnic Science [Völkerkunde], and so on, and their interconnection may fairly often produce a very brightly coloured whole indeed. The author calls this kind of treatment "practical," and as such, it appears to him to be incorrect. So he elaborates further his methodological idea where geography is treated as a pure science. Its purpose is defined and consists in "...the naming of space in its different divisions, our orientation in the same, and the clear and vivid representation of the directions and relations of space."

But certainly it might be asked, whether geography can be treated as science in this pure way. Geography belongs to the historical sciences (in the wider sense) and embraces in addition to nature description, the subdivision of the same that is called the describing sciences, as contrast to the enumerating sciences to which history (in the narrow sense) belongs. The essence of these historical sciences consists in their relations to individually occurring subjects of experience and not to subjects that are conceived in accordance with

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1Italics indicate words which have special logical meanings in eighteenth-century pedagogic theory.

2Edited by GutsMuths
general concepts, subordinated and known or constructed through general principles. Certainly they share the field of knowledge with the sciences of reason, but they are empirical, these others rational.

Pure science as synonymous with the contents of knowledge derived from principles of reason and not derived from experience is a science that geography cannot be. Just as little can there be a pure history. Pure or rational sciences proceed from general concepts and so on; but historical science proceeds from individual subjects of perception which it seeks to unite in a whole. The rational sciences lead us from theory to experience; the historical, from experience to theory. Only since Euclid and Socrates systematised their concepts by logical connections independent from experience can we speak of mathematics and philosophy as sciences. In the meantime, Herodotus had without theory already produced his master work. Experience brought to hand individual historical facts. We cannot reverse the requisite operation of scientific knowledge which is the same for entire nations as for individuals. Geography is a knowledge created from experience, and here the main assertion is grounded: that geography's method of instruction must be opposed to the methods of rational science.

As I understand it, Linder includes under pure geography only that which belongs to the essence of the same. So must we attempt first of all to focus on the most essential points. To Linder, geography is consistent with the word etymology: "...the art of representing the earth with lines." But why only with lines? The first from whom this expression [Ritter inserts the Greek term for earth description] is taken is Anaximander. The Agathemerus (LI.,p.1) says that he was the first to sketch a map of the populated parts of the earth ("As the first he dared to draw the oekumen on a tablet.") Hekataeus improved and accompanied it with written commentary. Could this have been merely a grid map? Anaximander's teaching appears not yet to have treated the earth as a globe, but only as the inhabited earth (oekumen), the orbis terrarum. This is also the original etymological meaning. Must we now understand under geography the same as we do under Earth description? Is geography only the knowledge of the quantity of the Earth, in connection with its nomenclature, as Linder states?

Certainly geography is related to individual corporeal subjects that exist external to us and near one another. But alone, geography is not the science of spatial relationship of these subjects, just as little as history alone is the science of chronological relationships.

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3 Ritter quotes in the original Greek.
Chronology is only a necessary condition of history, not its essence. The essence consists in the pragmatics of occurrences within these time relationships. Therefore, just as chronology (the mere naming of the most important historical subjects) does not exhaust the essence of history, just as little can mathematical geography as mere chorography and topography (the naming of places and countries) exhaust the essence of geography. Chronology and mathematical geography are only auxiliary sciences for historical studies, and the topical or naming of subjects, only nomenclature.

If one wishes to consider geography in this sense only as a pure science, so too must those propaedeutic mathematical preparatory exercises be omitted, for in the strictest sense these add up to nothing other than a part of geometry applied to the surface of the Earth.

But these mathematical exercises that proceed from the spherical shape of the Earth are also not sufficient for a grounding of this pure geography because the concept of the horizon and the vault of heaven must be applied to the globe in order to embrace this. Geography would therefore need to proceed first from an "Uranography" which for good reasons must be rejected as an elementary science.

For these reasons it is therefore not possible that the aforementioned method can be appropriate for elementary instruction. The methodological procedure for all historical sciences cannot be analytic, it must be synthetic.

The aforementioned method appears to me also not to be exhaustive because it seeks to dwell on only the quantitative and not the quality and relation of its subject. And this is the second point over which I hazard to communicate some remarks.

The science of all quantitative relationships is Größenlehre in respect to space and time. The topical part of geography is nomenclature. Now what still remains as the residual characteristics of this science? What is geography?

Description of the present situation of the Earth (insofar as we speak here only of the new geography) in all its relationships, as part of the world structure and considered as a whole itself. Its relationship to the world structure is dealt with by mathematical relationships.

*Größenlehre might be rendered as the teaching of size and scale relationships of phenomena in space and time.*
geography. Description in respect to the Earth itself is divided into two parts, insofar as its condition (here we always speak only of the Earth's surface) is a product of nature or of art. Physical geography concerns knowledge of the first part [i.e. nature]. The second part, or the description of the cultural relationships of the Earth's surface one might call economic geography, and as such, it could be separate or joined with the following.

But only insofar as a subject stands in certain relationship with us, can it be important to us. Our subject, therefore, is the Earth's surface, insofar as it is the home, the place of development of the animal world and mankind, and the arena of his activity. The interconnection of how the Earth's surface reacts on mankind and how mankind reacts on the Earth's surface is therefore a necessary part of this science. For want of a better term, I would like to name this the zoological part.

Should a division of the subject of geographic instruction be found, so the breakpoint of elementary instruction probably falls here, or rather, the first course of geography. In as much as earth description is only of importance to us in respect to mankind, mankind is to be considered not merely as individuals, but also as folk groups and nations. The entire science must therefore modify itself in accordance with these views and at this point necessarily separate natural earth description from civil (usually political) earth description, or rather earth science (Erdkunde).5

This second part, which appears entirely appropriate to me and amounts to the second course in geography, is the application of the first [part] to countries and folk groups, and is named therefore folk science and country science. With the exception of topical nomenclature, it includes portrayal of the influences of those parts that belong to natural earth description, that is, those parts that concern industry, trade, culture and civil relationships of countries and folk groups in their present circumstance.

This explanation of the concept of geography leads us to some considerations of the treatment and method of this science itself.

Its aim is a special and general familiarity with mankind in the arena of his activity; it is the description of this arena, not in respect to itself, but in respect to mankind. This is the entirely natural reason why geography delves into almost all areas of practical knowledge. To reproach geography for this is to negate its essence. As long as

5This is the first time that Ritter uses the word Erdkunde in his published works.
it cannot be denied that locality has the most decisive influence on all three kingdoms of nature and on the profitability of natural products, processing and distribution of the same, even so on the bodily structure and genial disposition of man, and on his possible and effective unity as a people or a state; so long as locality has the most decisive influence on the acceleration or retardation of its physical, intellectual and moral culture, so long as this cannot be denied, I say just so is geography not to be subordinated as a limited field.

On the contrary, geography is the bond of nature and the human world, inseparable from both. Geography is the necessary and first condition for the characterisation of both. I maintain that it is completely impossible to satisfactorily present any one of these three subjects, geography, natural history, and history along with folk science in isolation from the others. With every wandering step on this cloistered restricted path, one would long a thousand times for freer movement of the mind. If this ardent desire will not be satisfied, so one proceeds along his own path as if running an errand, an end unto itself. One does not wander with the breeze in nature, where heart and spirit open its surrounding riches, and where one considers the path itself as the goal, but where with every step the aim is delayed further. We must not think of these sciences as goddesses that stride ahead jealous of their area on unconnected highways in measured distance from one another. They are in the same way sisters that wander arm in arm in pursuit of an aim, in pursuit of the universe. This lofty aim can only be reached with united forces.

How would it be possible to explain even the first concepts of topography, e.g. what is water and earth, land and sea, mountain and surface, height and valley, rock and canyon, spring and brook, river and current and so on without illustration from nature teachings? How would it be possible to explain what is fertile and unfertile, stony, limy, sandy or what garden mould is, or peat, and what constitutes suitable or unsuitable soil? How would it be possible to characterise mountain chains, their form and interconnection without speaking of their components that constitute the conditions of these forms without explanation from mineralogy? How would it be possible to speak about the products of a country without explaining or communicating knowledge from all three kingdoms of nature, or to speak about the advantages and processing of these products without knowledge of technology. It is inconceivable to me how one could intend to give distinct ideas of this elementary knowledge of geography without delving into the area of natural history and conversely to give a presentation of natural history (one would have to place its essence in nature description) without taking geography into consideration. Just as it is impossible to speak about the occupant of the Earth without more or less delving into the
area of history, conversely it will not be possible to speak about historical events without a backward glance at the Earth's surface.

These remarks suggest that the most natural method is no doubt that which seeks to unite all these various subjects in a whole. Hence this method leads from the particular to the general in conformity with the nature of the various subjects. It is in the phenomena at the place where the child lives and learns to see, that he seeks to establish and orient himself. It is in the city or village, in the mountain or valley, not in the parlour from a map or book, but in nature, where the child can receive his first geographic concepts, this is always the same [no matter where a child lives]. This elementary method combines all the demands of science and method and is therefore the only method. Here the child learns to know a country in all its circumstances and to understand by self-drawn illustrations the maps of all countries. If this elementary education is concluded properly, most of the difficulties that geography presents are dispelled, like the rest of instruction.

First Course. Natural Earth Description. For this I depend on the simplest, most propaedeutic and most necessary teachings of mathematical geography as well as the mathematical preparatory exercises with circles, spheres and cubes which Linder in his article has given many excellent tips. But I would not follow his exercises further except as far as the teaching of zones. Only if could assume some previous geometric knowledge by the student would I then go a step further as Linder and convert some Earth areas into rectilinear polygons and attempt the measurement of inscribed triangles. The standard measure would be degrees form the equator and the type of projection chosen would in respect to surface representation deviate the least from the spherical shape. The first attempt would be made with special large-scale maps from the country which one inhabits. This would be necessary in order to receive some measured point of comparison for relative scale. Distinctness and determinateness is only achieved in the end by those who learn to judge distances through great trips.

Instead of stretching over the Earth's surface a right angled mathematical grid, I would determine everything solely through the natural divisions of the Earth's surface in order to establish the themes. These orientations of degrees of longitude and latitude are only fruitful for mathematical Earth description and are of absolutely no influence on the remaining parts. For these, it remains only an arbitrary introductory foundation. On the other hand, orientation of the Earth's surface in accordance to the natural divisions that the Earth's surface offers is extremely fruitful for geography and all related sciences. It is an undertaking that brings forth from the Earth itself a determinate image in the mind. The
natural divisions that we learn to know precisely [through this method], constitute at the same time, the basis of all political geography; and if natural division is applied to political geography, only then is political geography capable of a pragmatic treatment.

Boundaries formed by the seas form the first division: fixed lands and islands. Divisions of the seas are: world seas, sea shores of the world sea, middle seas; subdivisions are; gulfs, bays, harbours, coves, estuaries, canals and sea straits.

Boundaries of the land are: the watersheds of mountain chains and highlands, subdivisions of these are the mountain ranges with their boughs, branches, plateaus or foothills.

These divide the entire Earth surface most definitively into great river basins of the contiguous seas. The four world areas always present four divisions of these river basins into the northern, eastern, southern and western slopes. The rivers form river districts. What does not belong to any river basin of a sea, is an interior land. In this way the Earth's surface is divided according to its own laws in the most exact way into physical continents, areas and districts. The importance of these laws of division for the training of the eye and the development of a knowledge of the Earth is something I want to pass over. But it has the greatest influence on geographical instruction. For these same laws of demarcation affect the characteristic peculiarities of the climates, the mountain types, the topographical features as well as mineralogical products, the plant world and the animal world of each area and its districts in ceaseless continuity. In this regard one considers, for example, the river basins of the Baltic, the North Sea, the Mediterranean, the Adriatic and others. But still further, the same influence presents itself also in the occupants of these natural land areas, for they live under the same influence of climate and have corresponding means of subsistence, they develop corresponding types of trade, land cultivation and navigation, and in character and cultural relationships, they will exhibit collectively more or less what is dependent on locality. Through this procedure, would not the study of Geography be greatly simplified and scientifically ordered (i.e. according to inner laws, not positive directions)? If the surface of the Earth is now known in its individual occurrences in accordance with this viewpoint, so the results can be united and the student be brought to a general viewpoint. If one tries this procedure, one will be amazed over the remarkable results and the simplification, along with the advantage of the procedures easy comprehension. Still, we have no special auxiliary aids, no maps and teaching books which were produced for this course. On the other hand, it is not that necessary since self-drawn maps are necessary for teacher and student, and each can
fashion the most indispensable himself. But this can hardly be demanded of teachers who are already overloaded with work. A small contribution to the auxiliary aids of this course appear under the title: "Six Charts of Europe with Explanatory Texts, etc. as an Auxiliary Aid for Instruction in Earth Description," Schnepfenthal: Erziehungsanstalt. In this work Europe is presented in its primary relations in the indicated way.

Along with this course, natural history is taught simultaneously, albeit in another hour. Likewise it completes its elementary development in the place where the student lives by the method of sense perception. Just as geography roams from continent to continent, so natural history must accompany it. Both are supported in the most interesting ways. If now the general results concerning the circumstances of countries are united, so too this occurs in respect to natural bodies whose outline is united also by a natural system in a whole.

Second Course--Political Earth Science (Erdkunde). Only now should positive geography, which depends on the activities of mankind, be taught. The student learns the kingdoms, principalities, the provinces and districts, to plot their names and borders on the real surface of the Earth. He will now receive a concept of the deeds of nature and the deeds of man. He will easily discern the causes of forms, and where these do not agree with the properties of nature, he will search for them in special relationships and circumstances (one attempts this now with maps--countless wars, peace treaties, political arrangements and so on have their foundations therein). The entire kingdom will lie clearly before him in its main relationships with all divisions and the diversities of its country, climate, and thereby also the development of its culture, its occupant, its number of cities, primary capacities and so on. The student will become familiar with the philosophic viewpoint, that the land is not bound to the state, but the state to the land, that everything the state contains is modified in the most definite ways. In short, through this method of considering detail not for details sake, but for the sake of the whole, the great world view will be prepared, the view of the universe, not in its parochial spirit killing sense, or by considering the higher world order as a work of mankind, but in its higher sense.

At the same time, this way is the single, truthful preparation which leads to a intellectual study of history, the history of the development of the human spirit among the various zones, through all centuries. (In this respect, one turns for example to every page of Heeren's *Ideas concerning Politics and Trade of the Ancient States.* It is even necessary for the history of wars and battles.)
Furthermore, in spite of the last decade of innumerable state, country and province exchanges, it is the only work that can still be read without *confusions* in the mind of the novice.

While the student has inscribed the newest border changes of a country on his map, or has *compared* them, he is led to the way in which mankind employs natural advantages for industry and for trade. In my opinion, this instruction must be brought together simultaneously with the best scientific instruction in technology and production science (i.e. in another hour of instruction but in the same general period of education) whose elementary instruction are also brought together at that time.

Instruction, I say, should expand itself now further to include mankind, as the last aim of every science, and should close with folk science. The objection may arise here that this subject leads the student into a completely alien area, and that folk science presupposes human science.

The first point is true only insofar as geography is merely knowledge of the Earth itself. But if it is the knowledge of the Earth in respect to mankind, I cannot see how folk science can be alien to this in instruction because the distribution of folk groups, populations and national character is characterized so distinctly by locality. (One sees here the ethnographic map of Europe, one of the six earlier mentioned). But this instruction certainly presupposes human science! But what does Human Science presuppose? Psychology! And this in turn, philosophy and experience and so on. This objection can be easily made in all similar cases, it only confirms the interlocking of all our knowledge. The student who begins this instruction must have already received some explanation. He can now easily pass on further from his observations of the outer appearances of mankind to those of other things that he does every day anyway. Here the discourse can only be of national character or, if one will, of the peculiarities of nations, not from the moral and intellectual standpoint in which they are found. It is not so difficult to communicate that to the student insofar as it is relevant to the bodily structure, temperament, way of life, customs, historicity, games, inclinations and religious conceptions. Even for these latter it is not so difficult, because they are always accompanied in less cultivated nations by sensual *ideas* abstracted from local surrounding nature. In this folk science it appears necessary that some historical direction be provided concerning distribution, interbreeding and descent of the folk tribes, in order to obtain information about the dwelling place of the folk groups, their numbers, their cultural relationships (whether they are oppressed or
But if one wants to maintain that these subjects must generally be expounded separately and in isolation for the sake of instruction (as for example a separate human science segregated from all others, then too it cannot find a place in contemporary history), so I cannot agree. This separation lies only in us. In reality everything stands in a necessary connection and this connection can never be grasped by separating the plenitude. Two sure ways lead us to the goal. The exercise of the mind in the rational sciences consists of abstraction, in the division of the simple. The exercise of the mind in the descriptive and narrative sciences consists in comprehension of the plenitude. Reason belongs to the discourse of these sciences, to the discourse of these arts of presentation. That presupposes the ability to examine, this to comprehend. In that exists the act of insight, in this cognition. Through this cognition the mind is self-acting, here receptive. Both are necessary, indispensable to knowledge. If we proceed against these natural laws of the mind, so we can never reach a complete method. And this reproach concerns those who treat everything according to laws. The reproach has to do with that which the immortal Schweizer’s Method attempts to bring to all the sciences, where the same single-aspect development of the cognitive faculty is promoted, that Pestalozzi justifiably reproaches as mere instruction of superficial knowledge and which the poet Voss makes of the scientific instruction of the Bavarian School curriculum in his recent clever review.

But I do not know why in the methods of these sciences, one puts up with the lack of means for a formal development of the mind, or classes them only as a handyman in the area of human knowledge, that only exists to provide a repository of recollections as a pharmacist with a stock of medicine, that is to be used only in exceptional instances in life, otherwise in principle, it absolutely does not belong to the general needs of human life. Is there not innumerable arithmeticians which attain no formal education through their science? Is there not innumerable disciples of philosophic systems which do not become philosophers? Is science or methods of science to be indicted here? Just so, how many historically living repertoriums, or how many collectors of natural historical specimens are there, without their being a historian or naturalist?

I maintain that the representing sciences be treated as subjects of instruction and likewise be treated intensively to develop the facilities of the mind.
Kant says (Anthropologie, p. 22): "One sees well that if the capacity of knowledge is generally to be called understanding, this would have to contain the capacity for; apprehension (attentio) of given ideas in order to bring forth intuition; the capacity for abstraction of what is common to several (abstractio) in order to bring forth concept; and the capacity for reflection (reflexio) in order to bring forth knowledge of the subject."

This power of apprehension is now that which is developed intensively and is just as necessary for reflexion as the power of abstraction. This capacity of apprehension or receptivity of the inner man is what makes him able to become aware of that which the act of apprehension makes possible. And the exercise of this act in connection with the reflexive capacity must be brought to a fluency in the soul. The capacity (and it is really not a capacity because we call it inactive and passive in opposition to spontaneous activity) that is the prerequisite of this act, must be capable of an intensive or formal education. The formal means of developing this ability is the representing sciences. If one has not heretofore used it generally as such, so it is not the fault of the representing sciences (in some instances it has been done). Therefore it is wrong to consider them only as auxiliary sciences in the instruction of youth.

Both means of instruction, the rational and representing sciences, must hand in hand help man to acquire himself a harmonious education if he is not to live only in the world of ideas, or only in the empirical world, but should attain to a complete development of his powers of knowledge.

The operation of the methods of these sciences, as formal means of education, I will call, in order to express "one through the other" and not "one next to the other," the pragmatic means, because I can find no better word for this. I understand therein: representation of the plenitude as a continuous and constant whole in respect to circumference and content. Each of these individual sciences is capable of this pragmatic type of treatment (even if it is still limited to special circles). In turn the pragmatic type of treatment fashions the great world view which is as far removed from compartmentalised scholarship and superficiality, as world wisdom is from metaphysical reverie and common sense.

Ritter, Educator in Frankfurt-am-Main.
NOTATIONS

I was not able to express definitively and distinctly enough, in so few words, such an important subject, which at best sheds light by a probe into the details: one needs only a few master works to study, the result of such a pragmatic procedure. I cite here only some of the most excellent which happen to come to mind. For Geography: Strabo’s Earth description of Italy; many passages in Heredotus’ country descriptions; Beaujour treatise on Macedonia; Volney on Syria; Mitford in his Greek history; from Zimmerman in his geographical writings. For mineralogy, e.g. von Buch’s mineralogical trip through Salzburg. For natural history generally: von Humboldt’s Ideas for a Physiognomy of Vegetation; Buffon’s and Gotze’s works. For history one instead of all: Heeren’s Ideas concerning Politics and trade of the Ancient States. And for the spirit in general which embraces everything, Herder’s immortal work.