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## THE MORPHOLOGY OF LANDSCAPE

Carl O. Sauer

One of the century's most eminent geographers, Carl Sauer (1889–1975) was associated with the University of California, Berkeley, for most of his academic life. While a graduate student at Chicago he had attended lectures by Ellen Semple (chapter 14) but came to reject her brand of environmentalism as dogmatic. In one of his few methodological statements, 'Morphology' presented a coherent alternative derived from mainly German geographical influences, many of which he shared with Hartshorne (chapter 24) despite their evident clashes over the question of time. Geography could not be defined as an abstract relationship, it had to have a substantive content, the cultural landscape. This emphasized the material record of humans upon the landscape and the areal association of physical and cultural phenomena, excluding customs and beliefs. The essay was well received by his contemporaries but Sauer's own work in Mexico and Latin America rarely stuck to this programme. He figured prominently in studies of the origins of agriculture, the diffusion of plants and animals, and the impact of conquest upon indigenous American societies. Sauer was a prime mover of the Princeton symposium on Man's Role in Changing the Face of the Earth, in 1955, and a long-time advocate of a less destructive attitude towards the environment. But many later geographers (for example, Daniels, chapter 19) have criticized his methodological statements for containing an inadequate or determinist concept of culture.

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## Introduction

Diverse opinions regarding the nature of geography are still common. The label, geography, as is the case with history, is no trustworthy indication as to the matter contained. As long as geographers disagree as to their subject it will be necessary,

through repeated definition, to seek common ground upon which a general position may be established. In this country a fairly coherent series of viewpoints has been advanced, especially through presidential addresses before the Association of American Geographers, which may be accepted as mirror and mould of geographic opinion in America. They are sufficiently clear and well known that they need not be restated.<sup>1</sup> In European geography a somewhat different orientation appears to be developing. In various quarters significant activity is being displayed, probably in some measure influenced by anti-intellectualist currents. At any rate a shaking up of some vigor is under way. It may therefore be appropriate to reexamine the field of geography, keeping current views abroad especially in mind, in order to attempt a working hypothesis that may serve to illuminate in some degree both the nature of the objective and the problem of systematic method.

## The Field of Geography

*The phenomenologic view of science.* – All science may be regarded as phenomenology,<sup>2</sup> the term science being used in the sense of organized process of acquiring knowledge, rather than in the common restricted meaning of a unified body of physical law. Every field of knowledge is characterized by its declared preoccupation with a certain group of phenomena, which it undertakes to identify and order according to their relations. These facts are assembled with increasing knowledge of their connection; the attention to their connection denotes scientific approach. "A fact is first determined when it is recognized as to limits and qualities, and it is understood when it is viewed in its relations. Out of this follows the necessity of predetermined modes of inquiry and of the creation of a system that makes clear the relation of the phenomena. . . . Every individual science is naïve as a special discipline, in so far as it accepts the section of reality which is its field *tel quel* and does not question its position in the general scene of nature; within these limits, however, it proceeds critically, since it undertakes to determine the connection of the phenomena and their order."<sup>3</sup> According to such definition of the grounds of knowledge, the first concern is with the phenomena that constitute the "section of reality" which is occupied by geography, the next with the method of determining their connection.

*Geography as a 'naïvely given section of reality.'* – Disagreement as to the content of geography is so great that three distinct fields of inquiry are usually designated as geography: (1) The study of the earth as the medium of physical processes, or

<sup>1</sup> In particular the following addresses are notable expressions of leading opinion: Davis, W. M., "An Inductive Study of the Content of Geography," *Bull. Am. Geog. Soc.*, vol. 38, pp. 67–84 (1906); Fenneman, N. M., "The Circumference of Geography," *Ann. Assoc. Am. Geog.*, vol. 9, pp. 3–12 (1919); Barrows, H. H., "Geography as Human Ecology," *ibid.*, vol. 13, pp. 1–14 (1923).

<sup>2</sup> v. Keyserling, H., *Prolegomena zur Naturphilosophie*, p. 11 (1910).

<sup>3</sup> *Ibid.*, pp. 8 and 11.

the geophysical part of cosmologic science; (2) the study of life-forms as subject to their physical environment, or a part of biophysics, dealing with tropisms; and (3) the study of the areal or habitat differentiation of the earth, or chorology. In these three fields there is partial accordance of phenomena, but little of relation. One may choose between the three; they may hardly be consolidated into one discipline.

The great fields of knowledge exist because they are universally recognized as being concerned with a great category of phenomena. The experience of mankind, not the inquiry of the specialist, has made the primary subdivisions of knowledge. Botany is the study of plants, and geology that of rocks, because these categories of fact are evident to all intelligence that has concerned itself with the observation of nature. In the same sense, area or landscape is the field of geography, because it is a naïvely given, important section of reality, not a sophisticated thesis. Geography assumes the responsibility for the study of areas because there exists a common curiosity about that subject. The fact that every school child knows that geography provides information about different countries is enough to establish the validity of such a definition.

No other subject has preempted the study of area. Others, such as historians and geologists, may concern themselves with areal phenomena, but in that case they are avowedly using geographic facts for their own ends. If one were to establish a different discipline under the name of geography, the interest in the study of areas would not be destroyed thereby. The subject existed long before the name was coined. The literature of geography in the sense of chorology begins with parts of the earliest sagas and myths, vivid as they are with the sense of place and of man's contest with nature. The most precise expression of geographic knowledge is found in the map, an immemorial symbol. The Greeks wrote geographic accounts under such designations as *periplus*, *periodos*, and *periegesis* long before the name geography was used. Yet even the present name is more than two thousand years old. Geographic treatises appear in numbers among the earliest printed books. Explorations have been the dramatic reconnaissances of geography. The great geographic societies justly have accorded a place of honor to explorers. "Hic et ubique" is the device under which geography has stood always. The universality and persistence of the chorologic interest and the priority of claim which geography has to this field are the evidences on which the case for the popular definition may rest.

We may therefore be content with the simple connotation of the Greek word which the subject uses as its name, and which means most properly areal knowledge. The Germans have translated it as *Landschaftskunde* or *Länderkunde*, the knowledge of landscape or of lands. The other term, *Erdkunde*, the science of the earth in general, is falling rapidly into disuse.

*The thought of a general earth science is impossible of realization; geography can be an independent science only as chorology, that is as knowledge of the varying expression of the different parts of the earth's surface. It is, in the first place, the study of lands; general geography is not general earth science, rather it presupposes the general properties and processes*

*of the earth, or accepts them from other sciences; for its own part it is oriented about their varying areal expression.*<sup>4</sup>

With this preference of synthetic areal knowledge to general earth science the entire tradition of geography is in agreement.

*The interdependence of areal phenomena.* – Probably not even the adherents of other, recent schools of geography would deny place for such a view of the subject, but they deem this naïvely given body of facts inadequate to establish a science, or at the most would consider it an auxiliary discipline which compiles fragmentary evidence, to find its place ultimately in a general geophysical or biophysical system. The argument then is shifted from the phenomenal content to the nature of the connection of the phenomena. We assert the place for a science that finds its entire field in the landscape on the basis of the significant reality of chorologic relation. The phenomena that make up an area are not simply assorted but are associated, or interdependent. To discover this areal "connection of the phenomena and their order" is a scientific task, according to our position the only one to which geography should devote its energies. The position falls only if the non-reality of area be shown. The competence to arrive at orderly conclusions is not affected in this case by the question of coherence or incoherence of the data, for their characteristic association, as we find them in the area, is an expression of coherence. The element of time is admittedly present in the association of geographic facts, which are thereby in large part non-recurrent. This, however, places them beyond the reach of scientific inquiry only in a very narrow sense, for time as a factor has a well-recognized place in many scientific fields, where time is not simply a term for some identifiable causal relation. . . .

*Summary of the objective of geography.* – The task of geography is conceived as the establishment of a critical system which embraces the phenomenology of landscape, in order to grasp in all of its meaning and color the varied terrestrial scene. Indirectly Vidal de la Blache has stated this position by cautioning against considering "the earth as 'the scene on which the activity of man unfolds itself,' without reflecting that this scene is itself living."<sup>5</sup> It includes the works of man as an integral expression of the scene. This position is derived from Herodotus rather than from Thales. Modern geography is the modern expression of the most ancient geography.

The objects which exist together in the landscape exist in interrelation. We assert that they constitute a reality as a whole which is not expressed by a consideration of the constituent parts separately, that area has form, structure, and function, and hence position in a system, and that it is subject to development, change, and completion. Without this view of areal reality and relation, there exist only

<sup>4</sup> Hettner, A., "Methodische Zeit und Streitfragen," *Geog. Ztschr.*, vol. 29, p. 37 (1923). Hettner is cited here in the latest statement of the position he has defended ably for many years. To American geographers Fenneman's address of 1919, cited above, is ever memorable for its spirited declaration of the same thesis.

<sup>5</sup> *Principes de la géographie humaine*, p. 6 (1922).

special disciplines, not geography as generally understood. The situation is analogous to history, which may be divided among economics, government, sociology, and so on; but when this is done the result is not history.

### The Content of Landscape

*Definition of landscape.* – The term 'landscape' is proposed to denote the unit concept of geography, to characterize the peculiarly geographic association of facts. Equivalent terms in a sense are 'area' and 'region.' Area is of course a general term, not distinctively geographic. Region has come to imply, to some geographers at least, an order of magnitude. Landscape is the English equivalent of the term German geographers are using largely and strictly has the same meaning, a land shape, in which the process of shaping is by no means thought of as simply physical. It may be defined, therefore, as an area made up of a distinct association of forms, both physical and cultural.<sup>9</sup>

The facts of geography are plain facts; their association gives rise to the concept of landscape. Similarly, the facts of history are time facts; their association gives rise to the concept of period. By definition the landscape has identity that is based on recognizable constitution, limits, and generic relation to other landscapes, which constitute a general system. Its structure and function are determined by integrant, dependent forms. The landscape is considered, therefore, in a sense as having an organic quality. We may follow Bluntschli in saying that one has not fully understood the nature of an area until one "has learned to see it as an organic unit, to comprehend land and life in terms of each other."<sup>10</sup> It has seemed desirable to introduce this point prior to its elaboration because it is very different from the unit concept of physical process of the physiographer or of environmental influence of the anthropogeographer of the school of Ratzel. The mechanics of glacial erosion, the climatic correlation of energy, and the form content of an areal habitat are three different things.

*Landscape has generic meaning.* – In the sense here used, landscape is not simply an actual scene viewed by an observer. The geographic landscape is a generalization derived from the observation of individual scenes. Croce's remark that "the geographer who is describing a landscape has the same task as a landscape painter"<sup>11</sup> has therefore only limited validity. The geographer may describe the individual landscape as a type or possibly as a variant from type, but always he has in mind the generic, and proceeds by comparison.

An ordered presentation of the landscapes of the earth is a formidable undertaking. Beginning with infinite diversity, salient and related features are selected

<sup>9</sup> Sölch, J., *Auffassung der natürlichen Grenzen* (1924), has proposed the term 'Chore' to designate the same idea.

<sup>10</sup> "Die Amazonasniederung als harmonischer Organismus," *Geog. Ztschr.*, vol. 27, p. 49 (1921).

<sup>11</sup> Quoted by Barth, P., *Philosophie der Geschichte* (ed. 2), p. 10.

in order to establish the character of the landscape and to place it in a system. Yet generic quality is non-existent in the sense of the biologic world. Every landscape has individuality as well as relation to other landscapes, and the same is true of the forms that make it up. No valley is quite like any other valley; no city the exact replica of some other city. In so far as these qualities remain completely unrelated they are beyond the reach of systematic treatment, beyond that organized knowledge that we call science. "No science can rest at the level of mere perception. . . . The so-called descriptive natural sciences, zoology and botany, do not remain content to regard the singular, they raise themselves to concepts of species, genus, family, order, class, type."<sup>12</sup> "There is no idiographic science, that is, one that describes the individual merely as such. Geography formerly was idiographic; long since it has attempted to become nomothetic, and no geographer would hold it at its previous level."<sup>13</sup> Whatever opinion one may hold about natural law, or nomothetic, genetic, or causal relation, a definition of landscape as singular, unorganized, or unrelated has no scientific value.

*Element of personal judgment in the selection of content.* – It is true that in the selection of the generic characteristics of landscape the geographer is guided only by his own judgment that they are characteristic, that is, repeating; that they are arranged into a pattern, or have structural quality, and that the landscape accurately belongs to a specific group in the general series of landscapes. Croce objects to a science of history on the ground that history is without logical criteria: "The criterion is the choice itself, conditioned, like every economic art, by knowledge of the actual situation. This selection is certainly conducted with intelligence, but not with the application of a philosophic criterion, and is justified only in and by itself. For this reason we speak of the fine tact, or scent, or instinct of the learned man."<sup>14</sup> A similar objection is sometimes urged against the scientific competence of geography, because it is unable to establish complete, rigid logical control and perforce relies upon the option of the student. The geographer is in fact continually exercising freedom of choice as to the materials which he includes in his observations, but he is also continually drawing inferences as to their relation. His method, imperfect as it may be, is based on induction; he deals with sequences, though he may not regard these as a simple causal relation.

If we consider a given type of landscape, for example a North European heath, we may put down notes such as the following:

*The sky is dull, ordinarily partly overcast, the horizon is indistinct and rarely more than a half-dozen miles distant, though seen from a height. The upland is gently and irregularly rolling and descends to broad, flat basins. There are no long slopes and no symmetrical patterns of surface form. Watercourses are short, with clear brownish water, and perennial. The brooks*

<sup>12</sup> Barth, *op. cit.*, p. 11.

<sup>13</sup> *Ibid.*, p. 39.

<sup>14</sup> *On History*, pp. 109, 110. The statement applies to the history that has the goal simply of "making the past live again." There is, however, also a phenomenologic history, which may discover related forms and their expression.

end in irregular swamps, with indistinct borders. Coarse grasses and rushes form marginal strips along the water bodies. The upland is covered with heather, furze, and bracken. Clumps of juniper abound, especially on the steeper, drier slopes. Cart traces lie along the longer ridges, exposing loose sand in the wheel tracks, and here and there a rusty, cemented base shows beneath the sand. Small flocks of sheep are scattered widely over the land. The almost complete absence of the works of man is notable. There are no fields or other enclosed tracts. The only buildings are sheep sheds, situated usually at a distance of several miles from one another, at convenient intersections of cart traces.

The account is not that of an individual scene, but a summation of general characteristics. References to other types of landscape are introduced by implication. Relations of form elements within the landscape are also noted. The items selected are based upon "knowledge of the actual situation" and there is an attempt at a synthesis of the form elements. Their significance is a matter of personal judgment. Objective standards may be substituted for them only in part, as by quantitative representation in the form of a map. Even thus the personal element is brought only under limited control, since it still operates in choosing the qualities to be represented. All that can be expected is the reduction of the personal element by agreeing on a "predetermined mode of inquiry," which shall be logical.

*Extensiveness of areal features.* – The content of landscape is something less than the whole of its visible constituents. The identity of the landscape is determined first of all by conspicuousness of form, as implied in the following statement: "A correct representation of the surface form, of soil, and of superficially conspicuous masses of rock, of plant cover and water bodies, of the coasts and the sea, of areally conspicuous animal life and of the expression of human culture is the goal of geographic inquiry."<sup>15</sup> The items specified are chosen because the experience of the author has shown their significance as to mass and relation. The chorologic position necessarily recognizes the importance of areal extensiveness of phenomena, this quality being inherent in the position. Herein lies an important contrast between geography and physiography. The character of the heath landscape described above is determined primarily by the dominance of sand, swamp, and heather. The most important geographic fact about Norway, aside from its location, probably is that four-fifths of its surface is barren highland, supporting neither forests nor flocks, a condition significant directly because of its extensiveness.

*Habitat value as a basis for the determination of content.* – Personal judgment of the content of landscape is determined further by interest. Geography is distinctly anthropocentric, in the sense of value or use of the earth to man. We are interested in that part of the areal scene which concerns us as human beings because we are part of it, live with it, are limited by it, and modify it. Thus we select those qualities of landscape in particular that are or may be of use to us. We relinquish those features of area that may be significant to the geologist in earth history but are of no concern in the relation of man to his area. The physical qualities of landscape then are those that have habitat value, present or potential.

<sup>15</sup> Passarge, *Grundlagen der Landschaftskunde*, vol. 1, p. 1 (1920).

*The natural and the cultural landscape.* – "Human geography does not oppose itself to a geography from which the human element is excluded; such a one has not existed except in the minds of a few exclusive specialists."<sup>16</sup> It is a forcible abstraction, by every good geographic tradition a tour de force, to consider a landscape as though it were devoid of life. Because we are interested primarily in "cultures which grow with original vigor out of the lap of a maternal natural landscape, to which each is bound in the whole course of its existence,"<sup>17</sup> geography is based on the reality of the union of physical and cultural elements of the landscape. The content of landscape is found therefore in the physical qualities of area that are significant to man and in the forms of his use of the area, in facts of physical background and facts of human culture. A valuable discussion of this principle is given by Krebs under the title "Natur- und Kulturlandschaft."<sup>18</sup>

For the first half of the content of landscape we may use the designation 'site,' which has become well established in plant ecology. A forest site is not simply the place where a forest stands; in its full connotation, the name is a qualitative expression of place in terms of forest growth, usually for the particular forest association that is in occupation of the site. In this sense the physical area is the sum of all natural resources that man has at his disposal in that area. It is beyond his power to add to them; he may 'develop' them, ignore them in part, or subtract from them by exploitation.

The second half of landscape viewed as a bilateral unit is its cultural expression. There is a strictly geographic way of thinking of culture; namely, as the impress of the works of man upon the area. We may think of people as associated within and with an area, as we may think of them as groups associated in descent or tradition. In the first case we are thinking of culture as a geographic expression, composed of forms which are part of geographic phenomenology. In this view there is no place for a dualism of landscape.

## The Application of the Morphologic Method

*Form of induction.* – The systematic organization of the content of landscape proceeds with the repression of a priori theories concerning it. The massing and ordering of phenomena as forms that are integrated into structures and the

<sup>16</sup> Vidal de la Blache, P., *op. cit.*, p. 3.

<sup>17</sup> Spengler, O., *Untergang des Abendlandes*, vol. 1, p. 28 (1922–23): "Kulturen die mit urweltlicher Kraft aus dem Schooße einer mütterlichen Landschaft, an die jede von ihnen im ganzen Verlauf ihres Daseins streng gebunden ist, erblühen."

<sup>18</sup> *Ztschr. Gesell. f. Erdkunde*, Berlin (1923), p. 83. He states the content of geography as being "in the area (Raum) itself with its surfaces, lines, and points, its form, circumference, and content. The relations to geometry, the pure areal science, become even more intimate, when not only the area as such, but its position with reference to other areas is considered."

comparative study of the data as thus organized constitute the morphologic method of synthesis, a special empirical method. Morphology rests upon the following postulates: (1) that there is a unit of organic or quasi-organic quality, that is, a structure to which certain components are necessary, these component elements being called 'forms' in this paper; (2) that similarity of form in different structures is recognized because of functional equivalence, the forms then being 'homologous'; and (3) that the structural units may be placed in series, especially into developmental sequence, ranging from incipient to final or completed stage. Morphologic study does not necessarily affirm an organism in the biologic sense as, for example, in the sociology of Herbert Spencer, but only organized unit concepts that are related. Without being committed in any sense to a general biogenetic law, the organic analogy has proved most useful throughout the fields of social inquiry. It is a working device, the truth of which may perhaps be subject to question, but which leads nevertheless to increasingly valid conclusions.<sup>19</sup>

The term 'morphology' originated with Goethe and expresses his contribution to modern science. It may be well to recall that he turned to biologic and geologic studies because he was interested in the nature and limits of cognition. Believing that there were things "accessible and inaccessible" to human knowledge, he concluded: "One need not seek for something beyond the phenomena; they themselves are the lore (Lehre)." Thus originated his form studies, and especially those of homology of form. His method of scientific inquiry rested on a definite philosophic position.

If therefore the morphologic method appears unpretentious to the student who is eager to come to large conclusions, it may be pointed out that it rests upon a deliberate restraint in the affirmation of knowledge. It is a purely evidential system, without prepossession regarding the meaning of its evidence, and presupposes a minimum of assumption; namely, only the reality of structural organization. Being objective and value-free, or nearly so, it is competent to arrive at increasingly significant results. . . .

### Preparatory Systematic Description

*The first step in morphologic study.* - Historically "geography commenced by describing and registering, that is as a systematic study. It proceeded thereupon to . . . genetic relation, morphology."<sup>24</sup> The geographic study is still thus begun. The description of observed facts is by some predetermined order that represents a preliminary grouping of the material. Such systematic description is for the purpose of morphologic relation and is really the beginning of morphologic synthesis. It is therefore distinguishable from morphology not at all in principle

<sup>19</sup> The assumption 'as if,' advanced by Vaihinger as "Philosophie des Als Ob."  
<sup>24</sup> Krebs, *op. cit.*, p. 81.

but in that it lies at a lower critical level. The relation is not dissimilar to that between taxonomy and biologic morphology.

*Descriptive terminology.* - The problem of geographic description differs from that of taxonomy principally in the availability of terms. The facts of area have been under popular observation to such an extent that a new terminology is for the most part not necessary. Salisbury held that the forms of landscape had generally received serviceable popular names and that codification might proceed from popular parlance without the coining of new terms. Proceeding largely in this manner, we are building up a list of form terms, that are being enriched from many areas and many languages. Very many more are still awaiting introduction into geographic literature. These terms apply as largely to soil, drainage, and climatic forms as they do to land surface. Also popular usage has named many vegetational associations and has prepared for us a still largely unprospected wealth of cultural form terms. Popular terminology is a fairly reliable warrant of the significance of the form, as implied in its adoption. Such names may apply to single form constituents, as glade, tarn, loess. Or they may be form associations of varying magnitude, as heath, steppe, piedmont. Or they may be proper names to designate unit landscapes, as, for example, the regional names that are in use for most parts of France. Such popular nomenclature is rich in genetic meaning, but with sure chorologic judgment it proceeds not from cause but from a generic summation; namely, from form similarities and contrasts.

If systematic description is a desideratum for geography, we are still in great need of enlarging our descriptive vocabulary. The meagerness of our descriptive terms is surprising by comparison with other sciences. Contributing causes may be the idiographic tradition of unrelated description, and the past predilection for process studies which minimized the real multiplicity of forms.

*The predetermined descriptive system.* - The reduction of description to a system has been largely opposed by geographers and not entirely without cause. Once this happens the geographer is responsible within those limits for any areal study he undertakes; otherwise he is free to roam, to choose, and to leave. We are not concerned here with geography as an art. As a science it must accept all feasible means for the regimentation of its data. However excellent the individualistic, impressionistic selection of phenomena may be, it is an artistic, not a scientific desideratum. The studies in geomorphology, in particular those of the school of Davis, represent perhaps the most determined attempt to oppose uncontrolled freedom of choice in observation by a strict limitation of observations and of method. Different observations may be compared as to their findings only if there is a reasonable agreement as to the classes of facts with which they deal. The attempt at a broad synthesis of regional studies by employing our existing literature immediately runs into difficulties, because the materials do not fit together. Findings on the most important theme of human destructiveness of natural landscape are very difficult to make because there are no adequate points of reference. Some observers note soil erosion systematically, others casually, and still others may pay no attention to it. If geography is to be systematic and not idiosyncratic, there must be increasing agreement as to items of observation. In particular this

should mean a general descriptive scheme to be followed in the collection of field notes.<sup>25</sup>

A general descriptive scheme, intended to catalogue areal facts broadly, without proceeding at this stage from hypothetical origins and connections, has been recently proposed by Passarge under the name *Beschreibende Landschaftskunde*.<sup>26</sup> It is the first comprehensive treatment of this subject since v. Richthofen's *Führer für Forschungsreisende*, written just prior to the most flourishing period of geomorphology (1886). The work of Passarge is somewhat rough-hewn and it is perhaps excessively schematic, yet it is the most adequate consideration by far that the whole matter of geographic description has had. Its express purpose is "first of all to determine the facts and to attempt a correct presentation of the significant, visible facts of area without any attempt at explanation and speculation."<sup>27</sup> The plan provides

*for the systematic observation of the phenomena that compose the landscape. The method resembles most closely the Chrie, a device for the collection of material in theme writing. It helps to see as much as possible and to miss as little as possible and has the further advantage that all observations are ordered. If earlier geographers had been familiar with a method of systematic observation of landscape, it would have been impossible for the characteristic red color of tropical residual soils to have escaped attention until v. Richthofen discovered that fact.*<sup>28</sup>

Passarge proceeds with an elaborate schedule of notes covering all form categories of the landscape, beginning with atmospheric effects and ending with forms of habitation. From these he proceeds to a descriptive classification of form associations into larger areal terms. For the further elaboration of the plan the reader is referred to the volume in question, as worthy of careful consideration.

The author has applied his system elsewhere to the 'pure' as against the 'explanatory' description of areas, as for example in his characterization of the Valley of the Okavango, in the northern salt steppe of the Kalahari.<sup>29</sup> That he succeeds in giving to the reader an adequate picture of the composition of area will probably be admitted.

One may note that Passarge's supposedly purely descriptive procedure is actually based on large experience in areal studies, through which a judgment as to the significant constituents of landscape has been formed. These are really determined through morphologic knowledge, though the classification is not genetic, but properly based on the naively generic forms. The capacious dragnet which Passarge has fashioned, though disclaiming all attempt at explanation, is in reality a device fashioned by experienced hands for catching all that may be wanted in an areal morphology and for deferring explanation until the whole material is sorted.

<sup>25</sup> Sauer, C. O., "The Survey Method in Geography," *Ann. Assoc. Am. Geog.*, vol. 14, pp. 19 ff. (1924).

<sup>26</sup> *Grundlagen der Landschaftskunde*, vol. 1.

<sup>27</sup> *Ibid.*, p. vi.

<sup>28</sup> *Ibid.*, p. 5.

<sup>29</sup> *Hamburg Mitt. geog. Gesell.*, 1919, no. 1.

## Forms of Landscape and Their Structure

*The division between natural and cultural landscapes.* — We cannot form an idea of landscape except in terms of its time relations as well as of its space relations. It is in this continuous process of development or of dissolution and replacement. It is in this sense a true appreciation of historical values that has caused the geomorphologists to tie the present physical landscape back into its geologic origins, and to derive it therefrom step by step. In the chorologic sense, however, the modification of the area by man and its appropriation to his uses are of dominant importance. The area prior to the introduction of man's activity is represented by one body of morphologic facts. The forms that man has introduced are another set. We may call the former, with reference to man, the original, natural landscape. In its entirety it no longer exists in many parts of the world, but its reconstruction and understanding are the first part of formal morphology. Is it perhaps too broad a generalization to say that geography dissociates itself from geology at the point of the introduction of man into the areal scene? Under this view the prior events belong strictly in the field of geology and their historical treatment in geography is only a descriptive device employed where necessary to make clear the relationship of physical forms that are significant in the habitat.

The works of man express themselves in the cultural landscape. There may be a succession of these landscapes with a succession of cultures. They are derived in each case from the natural landscape, man expressing his place in nature as a distinct agent of modification. Of especial significance is that climax of culture which we call civilization. The cultural landscape then is subject to change either by the development of a culture or by a replacement of cultures. The datum line from which change is measured is the natural condition of the landscape. The division of forms into natural and cultural is the necessary basis for determining the areal importance and character of man's activity. In the universal, but not necessarily cosmologic sense, geography then becomes that part of the latest or human chapter in earth history which is connected with the differentiation of the areal scene by man. . . .

*Diagrammatic representation of the morphology of the natural landscape.* — We may now attempt a diagram of the nature of physical morphology to express the relation of landscape, constituent forms, time, and connecting causal factors [see Figure 17.1]. The thing to be known is the natural landscape. It becomes known through the totality of its forms. These forms are thought of not for and by themselves, as a soil specialist would regard soils, for example, but in their relation to one another and in their place in the landscape, each landscape being a definite combination of form values. Behind the forms lie time and cause. The primary genetic bonds are climatic and geognostic, the former being in general dominant and operating directly as well as through vegetation. The 'X' factor is the pragmatic 'and,' the always unequated remnant. These factors are justified as a device for the connection of the forms, not as the end of inquiry. They lead toward the concept of the natural landscape which in turn leads to the cultural landscape. The character of the landscape is determined also by its position on the time line. Whether

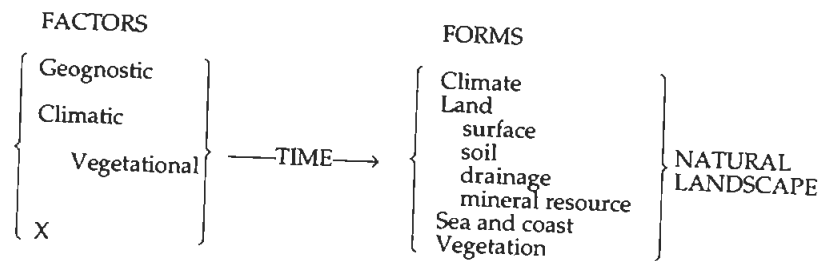


Figure 17.1 [orig. unnumbered]

this line is of determinate or infinite length does not concern us as geographers. In some measure, certainly, the idea of a climax landscape is useful, a landscape that, given a constancy of impinging factors, has exhausted the possibilities of auto-genous development. Through the medium of time the application of factor to form as cause and effect relation is limited; time itself is a great factor. We are interested in function, not in a determination of cosmic unity. For all chorologic purposes the emphasis of the diagram lies at its right hand; time and factor have only an explanatory descriptive rôle.

This position with reference to the natural landscape involves a reaffirmation of the place of physical geography, certainly not as physiography nor geomorphology as ordinarily defined, but as physical morphology which draws freely from geology and physiography certain results to be built into a view of physical landscape as a habitat complex. This physical geography is the proper introduction to the full chorologic inquiry which is our goal. . . .

*Summary of the form relations in the natural landscape.* – The large emphasis on climate in the previous statements does not mean that geography is to be transformed into climatology. The physical area is fundamental to any geographic study because it furnishes the materials out of which man builds his culture. The identity of the physical area rests fundamentally on a distinctive association of physical forms. In the physical world, generic character of area and its genesis are coupled so closely that the one becomes an aid to the recognition of the other. In particular, climate, itself an areal form, largely obscure as to origin, so largely controls the expression of the other physical forms that in many areas it may be considered the determinant of form association. An express disclaimer may be entered, however, against the notion of the necessity of a genetic bond in order to organize the phenomenology of the natural landscape. The existence of such bonds has been determined empirically. By regarding the relationship of forms we have discovered an important light on "the obscurity of their descent," but as geographers we are not enjoined to trace out the nature of this descent. This remains the problem of geomorphology, which indeed now appears more complicated than ever, the validity of climatic control and of great secular changes of climate being accepted.

Thus far the way is pretty well marked. We know the 'inorganic' composition of landscape fairly well, and, except for a somewhat excessive aloofness existing

properly cared for.

*The extension of morphology in the cultural landscape.* – The natural landscape is being subjected to transformation at the hands of man, the last and for us the most important morphologic factor. By his cultures he makes use of the natural forms, in many cases alters them, in some destroys them.

The study of the cultural landscape is, as yet, largely an untilled field. Recent results in the field of plant ecology will probably supply many useful leads for the human geographer, for cultural morphology might be called human ecology. In contrast to the position of Barrows in this matter, the present thesis would eliminate physiologic ecology or autecology and seek for parallels in synecology. It is better not to force into geography too much biological nomenclature. The name ecology is not needed: it is both morphology and physiology of the biotic association. Since we waive the claim for the measurement of environmental influences, we may use, in preference to ecology, the term morphology to apply to cultural study, since it describes perfectly the method that is involved.

Among geographers in America who have concerned themselves with systematic inquiry into cultural forms, Mark Jefferson, O. E. Baker, and M. Aurosseau have done outstanding pioneering. Brunhes' "essential facts of geography" represent perhaps the most widely appreciated classification of cultural forms.<sup>40</sup> Sten DeGeer's population atlas of Sweden<sup>41</sup> was the first major contribution of a student who has concentrated his attention strictly on cultural morphology. Vaughan Cornish introduced the concepts of 'march,' 'storehouse,' and 'crossroads' in a most valuable contribution to urban problems.<sup>42</sup> Most recently, Geisler has undertaken a synthesis of the urban forms of Germany, with the deserved subtitle: "A contribution to the morphology of the cultural landscape."<sup>43</sup> These pioneers have found productive ground; our periodical literature suggests that a rush of home-steaders may soon be under way.

*Diagrammatic representation of the morphology of the cultural landscape.* – The cultural landscape is the geographic area in the final meaning (*Chore*). Its forms are all the works of man that characterize the landscape. Under this definition we are not concerned in geography with the energy, customs, or beliefs of man but with man's record upon the landscape [see Figure 17.2]. Forms of population are the phenomena of mass or density in general and of recurrent displacement, as seasonal migration. Housing includes the types of structures man builds and their grouping, either dispersed as in many rural districts, or agglomerated into villages or cities in varying plans (*Städtebild*). Forms of production are the types of land utilization for primary products, farms, forests, mines, and those negative areas which he has ignored.

The cultural landscape is fashioned out of a natural landscape by a culture group. Culture is the agent, the natural area is the medium, the cultural landscape

<sup>40</sup> Brunhes, J., *Human Geography* (1910: Am. ed., 1920).

<sup>41</sup> *Befolkningens Fördelning i Sverige* (Stockholm, 1917).

<sup>42</sup> *The Great Capitals* (London, 1923).

<sup>43</sup> *Die deutsche Stadt* (Stuttgart, 1924).

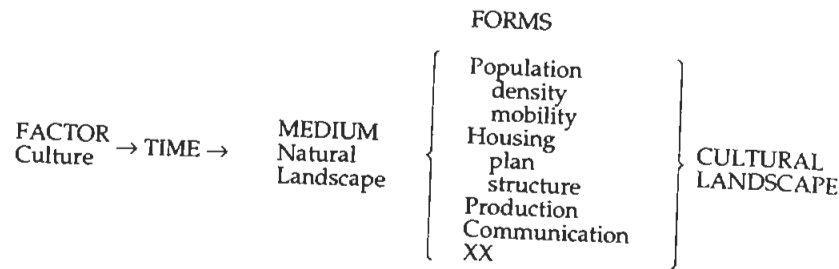


Figure 17.2 [orig. unnumbered]

group. Culture is the agent, the natural area is the medium, the cultural landscape the result. Under the influence of a given culture, itself changing through time, the landscape undergoes development, passing through phases, and probably reaching ultimately the end of its cycle of development. With the introduction of a different, that is, alien culture, a rejuvenation of the cultural landscape sets in, or a new landscape is superimposed on remnants of an older one. The natural landscape is of course of fundamental importance, for it supplies the materials out of which the cultural landscape is formed. The shaping force, however, lies in the culture itself. Within the wide limits of the physical equipment of area lie many possible choices for man, as Vidal never grew weary of pointing out. This is the meaning of adaptation, through which, aided by those suggestions which man has derived from nature, perhaps by an imitative process, largely subconscious, we get the feeling of harmony between the human habitation and the landscape into which it so fittingly blends. But these, too, are derived from the mind of man, not imposed by nature, and hence are cultural expressions.

### Morphology as Applied to the Branches of Geography

The consolidation of the two diagrams gives an approximation of the total scientific content of geography on the phenomenologic basis by which we have proceeded.<sup>44</sup> They may readily be expressed so as to define the branches of geography. (1) The study of the form categories per se in their general relation, the system of the forms of landscape, is morphology in the purely methodologic sense and is the equivalent of what is called, especially in France and Germany, general geography, the propaedeutic through which the student learns to work with his materials. (2) Regional geography is comparative morphology, the process of placing individual landscapes into relation to other landscapes. In the full chorologic sense, this is the ordering of cultural, not of natural landscapes. Such a critical

<sup>44</sup> The conclusions presented in this paper are substantially in agreement with Sten DeGeer's article "On the Definition, Method, and Classification of Geography," *Geog. Annaler*, 1923, pp. 1-37, with the contrast that a 'concrete' landscape takes the place of DeGeer's 'abstract' areal relation.

has thereby nearly rounded out a critique of the entire field of geography.<sup>45</sup> (3) Historical geography may be considered as the series of changes which the cultural landscapes have undergone and therefore involves the reconstruction of past cultural landscapes. Of special concern is the catalytic relation of civilized man to area and the effects of the replacement of cultures. From this difficult and little touched field alone may be gained a full realization of the development of the present cultural landscape out of earlier cultures and the natural landscape. (4) Commercial geography deals with the forms of production and the facilities for distribution of the products of areas.

### Beyond Science

The morphologic discipline enables the organization of the fields of geography as positive science. A good deal of the meaning of area lies beyond scientific regimentation. The best geography has never disregarded the aesthetic qualities of landscape, to which we know no approach other than the subjective. Humboldt's 'physiognomy,' Banse's 'soul,' Volz's 'rhythm,' Gradmann's 'harmony' of landscape, all lie beyond science. They seem to have discovered a symphonic quality in the contemplation of the areal scene, proceeding from a full novitiate in scientific studies and yet apart therefrom. To some, whatever is mystical is an abomination. Yet it is significant that there are others, and among them some of the best, who believe, that having observed widely and charted diligently, there yet remains a quality of understanding at a higher plane which may not be reduced to formal process.<sup>46</sup>

### Divergent Views of Geography

The geographic thesis of this article is so largely at variance with certain other views of the subject that it may be desirable to set forth in summary form what has been expressed and implied as to contrast in the several positions.

*Geomorphology as a branch of geography.* - German geographers in particular tend to regard geomorphology as an essential division of geography, and use largely the term *Oberflächengestaltung*, or the record of development of surficial form. The forms considered are ordinarily topographic only. The content of geomorphology has been most broadly defined by Penck,<sup>47</sup> who included the following forms: plains, hill surfaces, valleys, basins, mountains, cavernous forms, sea-coasts,

<sup>45</sup> *Vergleichende Landschaftskunde* (Berlin, 1923); *Landschaftsgürtel der Erde* (Breslau, 1923).

<sup>46</sup> A good statement of current searchings in this field is by Gradmann, R., "Das harmonische Landschaftsbild," *Ztschr. Gesell. Erdk.*, Berlin, 1924, pp. 129-147. Banse has been publishing since 1922 a non-or antiscientific journal, *Die Neue Geographie*, in which numerous good items are enclosed in a repellently polemic shell.

<sup>47</sup> *Morphologie der Erdoberfläche* (1894), vol. 2.



seafloors, islands. These descriptive topographic terms are studied by geomorphology as to their derivation, not as to use significance.

Geomorphology being the history of topography, it derives present surfaces from previous forms and records the processes involved. A study of the geomorphology of the Sierra Nevada is a history of the sculpturing of the mountain massif, concerned with the uplift of the earth block, and the stages of modification in which erosional processes, secondary deformations, and structural conditions are in complex relations. Relief features in this sense are the result of the opposition of orogenic and degradational processes through geologic periods of time. Certain features, such as peneplains and terrace remnants, thus have high diagnostic value in reading the record of modification of surface. These elements of the landscape, however, may be of little or no significance in the chorologic sense. To geomorphology the peneplain has been extremely important; the trend of geography has not been notably affected by its discovery. Out of the topographic complex the geomorphologist may select one body of facts illustrative of earth history, the geographer will use a largely different set of facts which have habitat significance.

The geomorphologist, therefore, is likely to be a specialized historical geologist, working on certain, usually late, chapters of earth history. Conventional historical geology is mostly concerned with the making of rock formations. The geomorphologist directs attention to erosional and deformational surfaces in the record of the rocks. To such an extent has this been the American orientation that we have in our country little geomorphologic work of recent date that is consciously geographic in purpose, that is, descriptive of actual land surfaces.

The geomorphologist can and does establish a connection between the fields of geography and geology and his labors further our own work. He advances our studies of landscape materially where he has preceded the geographer, and we properly regard him potentially as much a collaborator in geography as in geology. One of the present needs in American geography is a greater familiarity with and application of geomorphologic studies.

*Physiography and physical geography.* – When Huxley reapplied the term physiography he disclaimed expressly the desire to reform physical geography. He was not lecturing, he said, "on any particular branch of natural knowledge, but on natural phenomena in general."<sup>48</sup> The subtitle of his treatise read: "An Introduction to the Study of Nature." He chose the Basin of the Thames as the area for his demonstration, not through chorologic interest, but in order to show that any area contained abundant material for the demonstration of the general laws of physical science. Huxley said:

*I endeavored to show that the application of the plainest and simplest processes of reasoning to any of these phenomena, suffices to show, lying behind it, a cause, which will again suggest another; until, step by step, the conviction dawns upon the learner that, to attain to even an elementary conception of what goes on in his parish he must know something about the*

<sup>48</sup> Physiography (1877), p. vi.

*universe; that the pebble he kicks aside, would not be what it is and where it is, unless a particular chapter of the earth's history, finished untold ages ago, had been exactly what it was.*<sup>49</sup>

The two central ideas in his mind were the unity of physical law as shown by the features of the earth and the evolutionary march of the geologic record. It was the bright hour of dawn in scientific monism, with Huxley officiating at the observation of the lands. Physiography served in such a canonical rôle in elementary scientific education until a later age of machinery sent it into the discard in favor of 'general science.'

Physiography is still the general science of the earth, and concerns itself with the physical processes that operate at the surface of the earth and in the earth's crust. We still find the captions that Huxley introduced into his text: the work of rain and rivers, ice and its work, the sea and its work, earthquakes and volcanoes. These things have chorologic expression but they are studied as general processes. As an investigator the physiographer must be above all things a physicist, and increasing demands are made on his physical and mathematical knowledge. The way of the development of physiography as research is through geophysical institutes. Academically it fits in best as a part of dynamic geology. The geographer probably needs to know little more of it than he should know of historical geology.

One may question, therefore, the propriety of such terms as regional physiography and physiographic regions. They contradict the essential meaning of the subject and ordinarily mean rather a loose form of geomorphology, which of necessity has areal expression. Physiography was conceived as a purely dynamic relation and is categorically incapable of consistent areal expression unless it becomes also a name applied to physical geography or to geomorphology.

*Geographic morphology vs. 'geographic influences.'* – The study of the physical environment as an active agency has recently been subjected to trenchant criticism by L. Febvre, with an equally incisive foreword by Henri Berr.<sup>50</sup> Both thoroughly relish the chance to riddle this geographic ambition. Geography as they see it is "to give an example of the true task of synthesis. . . . The effort of synthesis is a directed activity; it is not a premature realization."<sup>51</sup> Questions of environment "may have for the geographer their interest; but they are not his end. He must guard well against acclaiming as 'scientific' verities theories of adaptation 'simpliste' in character which more competent people are in process of completing or correcting."<sup>52</sup> "What is, then, the commendable attitude in human geography? It can consist only in searching for the relations which exist between earth and life, the rapport which exists between the external milieu and the activity of the

<sup>49</sup> *Ibid.*, pp. vii, viii.

<sup>50</sup> *La terre et l'évolution humaine* (Paris, 1922).

<sup>51</sup> *Ibid.*, p. ix.

<sup>52</sup> *Ibid.*, p. 11.

occupants."<sup>53</sup> Vidal de la Blache's thesis that in the relation of man to the earth there exists less of necessary adaptation than of 'possibilisme' is worked out with skill and conviction. Excepting for their spirited devotion to the master of French geography, the authors are not really familiar with geographic thought. They do not fairly represent the tenets of geography because they know chiefly the publicists of environmentalism, against whom they consider Vidal as the outstanding bulwark. Vidal will have an honored place in the history of geography, but we are no longer much impressed by his concern to establish decently good relations with rationalistic thought. Rationalism has seen better days than these; we no longer need to come to terms with it by diplomatic compromise. In spite of the deficient orientation in geographic thought, the volume directs a quality of dialectic at one geographic school which entitles it to high rank in geographic criticism.

In this country the theme that geography is the study of natural environment has been dominant in the present generation. It has come to be advertised abroad that such is the American definition of geography.<sup>54</sup> The earliest term was 'environmental control.' This was succeeded by 'response,' 'influence,' 'adjustment,' or some other word that does not change the meaning, but substitutes a more cautious term for the ringing declaration of control. All these positions are mechanistic. In some way they hope to measure the force that physical environment exerts over man. The landscape as such has no interest for them, but only those cultural features for which a causal connection with the physical environment can be established. The aim, therefore, is to make of geography a part of biophysics, concerned with human tropisms.

Geographic morphology does not deny determinism, nor does it require adhesion to that particular faith in order to qualify in the profession. Geography under the banner of environmentalism represents a dogma, the assertion of a faith that brings rest to a spirit vexed by the riddle of the universe. It was a new evangel for the age of reason, that set up its particular form of adequate order and even of ultimate purpose. The exposition of the faith could proceed only by finding testimonials to its efficacy. To the true believer there were visible evidences of the existence of what he thought should be, which were not to be seen by those who were weak in the faith. Unless one has the proper temperament, the continued elaboration of this single thesis with the weak instruments at his hand becomes dreadfully monotonous. In such a study one knows beforehand that one will encounter only variants of the one theme of 'influence.'

The narrowly rationalistic thesis conceives of environment as process and of some of the qualities and activities of man as products. The agency is physical nature; man responds or adapts himself. Simple as the thesis sounds, it incurs continually grave difficulties in the matching of specific response to specific stimulus or inhibition. The direct influence of environmental stimuli is purely somatic. What happens to man through the influence of his physical surroundings is

<sup>53</sup> *Ibid.*, p. 12.

<sup>54</sup> Van Valkenburg, *Amsterdam Tijdschr.*, K. Ned. Aardr. Gesell., vol. 41, pp. 138, 139 (1924).

beyond the competence of the geographer; at most he may keep informed as to physiologic research in that field. What man does in an area because of tabu or totemism or because of his own will involves use of environment rather than the active agency of the environment. It would, therefore, appear that environmentalism has been shooting neither at cause nor at effect, but rather that it is bagging its own decoys.<sup>55</sup>

## Conclusion

In the colorful reality of life there is a continuous resistance of fact to confinement within any 'simpliste' theory. We are concerned with "directed activity, not premature realization" and this is the morphologic approach. Our naïvely selected section of reality, the landscape, is undergoing manifold change. This contact of man with his changeful home, as expressed through the cultural landscape, is our field of work. We are concerned with the importance of the site to man, and also with his transformation of the site. Altogether we deal with the interrelation of group, or cultures, and site, as expressed in the various landscapes of the world. Here are an inexhaustible body of fact and a variety of relation which provide a course of inquiry that does not need to restrict itself to the straits of rationalism.<sup>56</sup>

<sup>55</sup> Kroeber, A. L., *Anthropology* (1923), pp. 180-193, 502-503, scrutinizes the ex parte nature of environmentalist tenets in their relation to culture.

<sup>56</sup> Wissler, Clark, *Ecology*, vol. 5, p. 311 (1924): "While the early history of the concept is probably lost to us forever, there are not wanting indications that the ecological idea was conceived in the same atmosphere as the theory of design, or of purposeful adaptation. However that may be, the effort on the part of later professors of ecology has been to eschew all such philosophies except the fundamental assumption that plants and the rest of nature are intimately interdependent one upon the other." Thus "the anthropologist is not only trying to show what all the forms and forces of nature have done to man, but even with more emphasis what man has done to nature" (p. 312). This definition of anthropology includes a very large part of the social field, and is also a good definition for geography. At present anthropology is the study of culture per se. If our studies of man and of his work have large success in synthesis, a gradual coalescence of social anthropology and of geography may represent the first of a series of fusions into a larger science of man.