meeting at the Harvard Medical School on September 8, various aspects of biology will be discussed.

The biological program includes a paper on "Protein Molecules," by Professor Theodor Svedberg, University of Upsala; a lecture by Professor Kiyoshi Shiga, University of Tokyo, on "The Trend of Prevention, Therapeutics, and Epidemiology of Dysentery since Discovery of its Causative Organism"; and a report by Sir Joseph Barcroft, University of Cambridge, on "The Genesis of Respiratory Movements in the Foetus." Also outlining their recent work will be Professor August Krogh, University of Copenhagen; Dr. John H. Northrop, Rockefeller Institute for Medical Research; Professor Otto Warburg, Kaiser Wilhelm-Institut für Zellphysiologie; Dr. Karl Landsteiner, Rockefeller Institute for Medical Research; Professor Ross G. Harrison, Yale University; Professor Hans Spemann, University of Freiburg; Sir Frederick Hopkins, University of Cambridge; Professor Bernardo A. Houssay, University of Buenos Aires; Professor Filippo Silvestri, Regia Scuola Superiore di Agricultura, Portici, Italy, and Professor Johan Hjort, University of Oslo.

The conference on "Authority and the Individual," on September 8 and 9, will be taken part in by sixteen authorities in economics, public finance, history, politics, philosophy, jurisprudence, international law, classical philology, sociology, literature and music. The lectures will be grouped into four sections, "The State and Economic Enterprise," "Stability and Social Change," "The Place and Functions of Authority" and "Classicism and Romanticism."

Dr. John Dewey, professor emeritus, Columbia University, will address this symposium on "Authority and Resistance to Social Change"; Professor William E. Rappard, University of Geneva, will discuss "Economic Nationalism"; Professor Corrado Gini, University of Rome, will speak on "Authority and the Individual during the Different Stages of Evolution of the Nations," and Professor Charles McL. Andrews, emeritus, Yale University, on "Conservative Factors in Early Colonial History."

Other speakers include Professor Wesley C. Mitchell, Columbia University; Dr. Dennis H. Robertson, University of Cambridge; Professor Douglas B. Copland, University of Melbourne, Australia; Professor John H. Clapham, University of Cambridge; Professor Hans Kelsen, Institut Universitaire des Hautes Etudes Internationales, Geneva; Professor Werner W. Jaeger, University of Berlin; Professor Friedrich Meinecke, University of Berlin; Professor Paul A. M. Hazard, Collège de France; Professor Howard M. Jones, University of Michigan, and Professor Edward J. Dent, University of Cambridge.

Concluding the conference, sixteen authorities in archeology, history, philology, law, divinity, literature and philosophy will deliver papers on September 10 and 11 before the symposium on "Independence, Convergence and Borrowing in Institutions, Thought and Art." Of particular interest in this symposium is a section on "East and West," with addresses on the relations of different cultures by Professor Hu Shih, National University of Peiping; Professor Masaharu Anesaki, emeritus, Imperial University of Tokyo, and Professor Paul Pelliot, Collège de France.

Cultural and institutional relations between Europe and the Near East will be the topic of another section of this final symposium. Before this group, Professor Michael I. Rostovtzeff, Yale University, will speak of "Parthian Art"; Professor Tow J. E. Andrae, University of Upsala, will lecture on "Christianity and Early Islam," and Professor Louis Ginsburg, Jewish Theological Seminary of America, will discuss "Folklore: East and West." Other speakers will be Professor Vere G. Childe, University of Edinburgh; Professor Eduard Norden, University of Berlin; Professor Leopold Wenger, University of Vienna; Professor Rene Maunier, University of Paris, and Professor Charles H. Dodd, University of Cambridge.

In a third section of this symposium, various aspects of the Middle Ages will be treated by Professor Frederick M. Powicke, University of Oxford; Dr. Henry Osborn Taylor, New York City; Professor Adolph Goldschmidt, University of Berlin; Professor Charles Bedier, Collège de France, and Professor Etienne Gilson, director of the Institute of Medieval Studies, Toronto, Canada.

A STRATIGRAPHIC VIEW OF GEOGRAPHY

By Professor EUGENE VAN CLEEF
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SINCE the days of the brilliant Aristotle and the scholarly Eratosthenes, both of whom have been credited with having first used the term "geography," geographers have been attempting to define the scope of their field of investigation. The Greek philosophers, steeped more or less in the realm of mathematics, emphasized the descriptive aspects of geography but did not overlook that which we refer to to-day as regional. If Greek supremacy could have continued well into the first centuries A. D. and per-

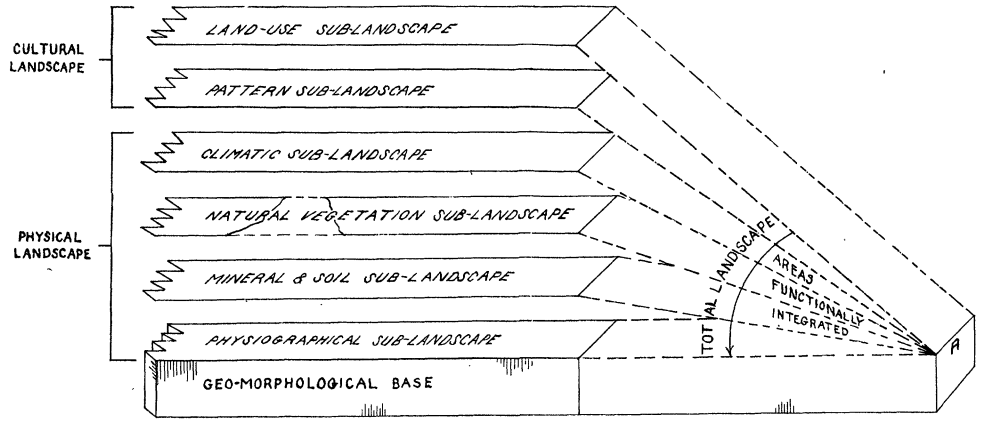

FIG. 1. A STRATIGRAPHIC VIEW OF GEOGRAPHY.

The total landscape is analyzed for its basic elements. Each element is portrayed as a plane to emphasize its areal unity. That the planes may be discontinuous is illustrated by the "natural vegetation sub-landscape" plane. Subsequent to the study of each plane, the relationship of each to any or all of the others is investigated and finally all the planes are synthesized into a single horizon known as the total landscape and resting upon the geo-morphological base. The total landscape is then considered as a unit region. (The dotted lines continuing the planes to A directs attention to the fact that the planes are component parts of a whole and in the total landscape are functionally integrated. Serrate ends of planes indicate flexible limits.)

haps until the medieval period, progress in the geographic field would undoubtedly have been greatly hastened. Even so, the influence of the Greeks was destined to pervade geographic thinking for a long time in consequence of the remarkable "Almagest" of Claudius Ptolemy and his analytical geographic writings. Ptolemy's analysis of geography has stimulated a group of our own geographers to style themselves "chorographers." This paper has been written to give consideration to that influence.

Ptolemy conceived "geography" as a description of the "öcumene" or habitable world, "chorography" as a somewhat fuller description of a region, and "topography" as a detailed description of a small locality. The description of his habitable world was mathematical. His geography was the equivalent of our present-day mathematical geography. Bunbury advances the belief that "Ptolemy devoted himself much more in the spirit of an astronomer than of a geographer in the higher sense of the word."[1] His geography focussed not only upon the earth as a planet but upon the mapping of it. There is little to indicate that he thought in terms of interpretation, even of its land forms, and yet the fact that he advanced a regional concept in his designation of chorography and topography seems to justify the belief that had Ptolemy possessed our present knowledge of the earth, he would have gladly consented to a telescoping or resolving of his three definitions into a single definition, and would have included therein two elements, namely, *description* and *interpretation*. Furthermore, since he apparently was imbued with the spirit of regionalism we venture to believe he would have insisted upon the consideration of *areas* as a third essential.

Immediately after the era of the Mediterranean philosophers there was a considerable hiatus in the development of geography as a science. Its growth was largely indirect, resulting from exploration and from the researches of men in other fields, more especially in physics, astronomy, biology and geology. The seventeenth and eighteenth centuries brought forth a considerable array of treatises in many different fields which contained both indirect and direct contributions to geography—the works of Clüver, Varenius, Montesquieu, Kant, Blumenbach, Herder and Büsching were especially valuable to their successors who specialized in geography.

Beginning with the early nineteenth century and continuing into the twentieth century geography was rejuvenated and crystallized by those master German minds of von Humboldt, von Richthofen, Ritter and Ratzel. Their contributions need not be detailed here, but it is important that we note their emphasis upon the "Raum" or regional concept. Whatever criticism may be launched against the philosophies of these men, we owe to them the organization of geography into a well-ordered science. Ritter, who was the outstanding exponent of the space relation theory, also emphasized the comparative viewpoint. It was his belief that a region should be studied so that it might be compared with other regions of the earth and that regions should be compared more especially for their

[1] E. H. Bunbury, "History of Ancient Geography," Vol. II, p. 548, 2nd edition, London, 1883.

differences than for their similarities. The study of microscopic areas was considered the proper mode of approach to the ultimate completion of a geography of the earth.

Man in relation to the physical environment, hinted at by some Greek philosophers, was revived by von Humboldt with special reference to primitive peoples, and elaborated, perhaps over-enthusiastically, by Ratzel in his "Anthropogeographie." Ratzel's environmentalism, strongly flavored by determinism, interpreted to the English-speaking world largely through Ellen Semple, exerted a powerful influence upon the researches of American geographers, still observable in many quarters. The French, too, were affected as evidenced by the writings of Vidal de la Blache, Vallaux and Brunhes, the latter two disciples of the de la Blache school. The works of these geographers contributed further to the shaping of the points of view of American writers.

A little over thirty years ago a division of geography, later to become independent, was established in the Department of Geology at the University of Chicago. J. Paul Goode, called to develop the courses in geography, fostered the "Raum" or regional concept which was strongly augmented by the Ratzelian teachings of Ellen Semple, perennial visiting lecturer. Although Goode wrote little, his influence was far-reaching through the activities of a considerable number of his students who were privileged to bask in the atmosphere of his enthusiastic leadership. Miss Semple's view-point shows its impress in much that has been written by those who listened to her detailed presentations.

Paralleling the years of growth of the department of geography at the University of Chicago and the rise of departments in other institutions, there evolved a few more or less tenuous theories relative to the science of geography, bearing particularly upon its definition and scope. Recently these ideas have focussed upon an improved technical vocabulary and upon quantitative methods in research. With these ambitions, the writer has been in full sympathy, as indicated by the titles of two papers written by him many years ago, one "The Language of Geography"[2] and the other "Leipzig—The Sum of Parallel Forces."[3]

Those who have been most energetic recently in fostering a vocabulary and a quantitative technique are members of the school of chorographers, already noted. This school not only stresses mapping and description as basic to chorography but insists that chorography is a method of approach to geography, that is, essentially a technique. At the same time, its members consider the term synonymous with regionalism. One of its proponents states: ". . . This is the chorographic technique. It differs from the others in that its immediate objective is the delimitation, description and interpretation of the areas which combined as in a mosaic make up the earth's surface."[4] Another gives the following as some of the "major tenets of the chorographer's Creed":

(1) Geography is a comparative study of the regions which comprise the earth's surface.
(2) Systematic description is an essential part of geography and must precede, and is coequal in importance with, interpretation.
(3) Man's *activities* are not of prime importance to the geographer but rather *observable material features* resulting from man's activities. Emphasis is upon a study of "things" rather than of "relationships."
(4) Features of natural environment function in a dual capacity in geography—
    a. They furnish a set of features or forms which give character to area. . . .
    b. They are only one of a number of agencies which may help to explain the forms, patterns and associations resulting from human occupance and use of the natural area.
(5) Cultural forms and patterns which are explainable in terms of natural features have no higher geographic quality than those which are explainable in terms of historical antecedents, racial characteristics or any other force or agency. There is no preference for any particular kind of explanation.[5]

Other statements[6] published subsequent to these quotations, by subscribers to the chorographic school, place similarly strong emphasis upon description as a primary and major objective in geographic presentation. These persons would probably relegate the environmental view-point to an inconsequential status. The chorographer is not interested in man's activities as such, but rather in "the observable material features" of a region, some of which may be the consequence of man's activities. Having described these observable materials he is willing to explain and interpret them, although this latter procedure seems not to be compulsory. Apparently we are to return almost wholly to the original literal meaning of the word "geogra-

[2] *Journal of Geography*, xi: 234–238, March, 1913.
[3] *Ibid.*, xii: 170–174, February, 1914.

[4] "The Objectives of Geography"—Preston James—from a mimeographed statement. Dr. James also offers in correspondence the following "broad all-inclusive statement of objectives," namely, "the description and interpretation of the face of the earth." The face of the earth includes "all the material objects which exist together in complex inter-relationship in the zone between the atmosphere and the lithosphere."

[5] "The Chorographical School of Geography"—Glen Trewartha—quoted from a mimeographed statement and from correspondence.

[6] See *Annals of the Association of American Geographers*, xxiv: 2, June, 1934.

phy," namely, earth description, which has been so roundly condemned in many quarters during these first years of the current century.

At this point we may well challenge the application of the terms chorography, chorographic and chorographer, as used by Ptolemy, to the concepts of the members of the so-called chorographic school, unless it is their wish to give these terms a modified or new connotation. If these chorographers are making literal use of Ptolemy's definition of chorography, then they must eliminate from their realm mathematical geography and its concomitant cartography to which Ptolemy paid so much attention, and also taboo microscopic studies which they have so rigorously advanced as a part of their chorographic doctrine.

It will be worth while to note what Hettner has to say about chorography, or chorology, which he uses synonymously with chorography. Few geographers are as well qualified to interpret this field. He says that chorology "is not a way," that it is not a method or technique but rather "the theme of geography itself. . . . Geographic considerations can not be other than chorological no more than historical considerations can be other than historical."[7] "The ultimate objective in the chorological viewpoint," Hettner states further, "is the recognition of the characteristics of countries and localities, growing out of the interrelationships of different natural realms and their various manifestations and the consideration of the whole earth's surface according to its natural divisions into continents, regions, natural provinces and localities.[8] And this to him constitutes the science of geography itself, which involves also the comparative and causal view-points. Thus Hettner attributes a much more inclusive meaning to Ptolemy's chorography than do our American chorographers.

In their zeal to press forward what seems to them to be a new point of view, these contemporary proponents of chorography have become enthusiasts for a methodology for use in field work which might well be clarified.[9] Granö, of Finland, has developed a methodology, probably strongly influenced by Passarge's "Landschaftskunde,"[10] to which it seems chorographers could readily subscribe and which contributes much to the elucidation of geographic objectives. Granö states that "man's environment as a material and visible complex of phenomena constitutes the fundamental objective in geographic research."[11] He believes the province of the geographer requires him to analyze the landscape and then to synthesize the analyses, for in any landscape obviously the parts are related and they must be finally viewed in their interrelationships.

In his analysis of a region, Granö recognizes a number of different landscapes constituting a unit or total landscape. He cites the landscape of land forms, of water forms, vegetation, settlement in terms of patterns, color, sounds, odors and still others. Some of these landscapes of course change with the seasons. A "sub-stratum" is included which refers to the firmness of the surface with respect to the weight which it will support, the angle of slope, earthquake disturbances and obstacles such as ice or snow. Having distinguished these landscapes and delineated them quantitatively Granö proceeds to synthesize them in such combinations as he chooses or as may be mathematically possible. On the basis of both analysis and synthesis he proceeds with interpretation. One of these landscapes or several combined may be interpreted as a natural region. While a region, according to Granö, must be characterized by homogeneity, every element within a total landscape need not be incorporated within a natural region map.

Here is an objective and a mode of approach which calls for description, mapping with precision and interpretation. It is sufficiently flexible and inclusive to allow even human ecologists and environmentalists, if they wish, to find protection under its wing. This rather lengthy preliminary statement to a much briefer proposal to follow has been presented because what I shall suggest is an attempt at clarification based upon the historical setting sketchily described.

Throughout the history of geographical thought the concept of regionalism manifests itself in one form or another, either real or implied, and with varying degrees of emphasis. To-day, we may venture to assume, geographers agree that their science is concerned with two fundamentals, namely, area and function. These elements involve three dimensions, two in the horizontal plane of area and one in a vertical plane involving the integration of function with area.

Taking a leaf from the chorographers, from Granö and from my own experience, it is my belief that in geographic analysis, area and function, respectively, should be kept intact. There should be no difficulty in doing this if geography is viewed "stratigraphically."

The term "stratigraphic" has been suggested by the field of geology, but is not borrowed with its full geological meaning. I am merely selecting certain of

[7] A. Hettner, "Die Geographie, Ihre Geschichte, Ihr Wesen und Ihre Methoden," p. 123. Ferd. Hirt, Breslau, 1927. 463 pp.

[8] *Ibid.*, p. 30.

[9] Many quantitative attempts have been predicated upon empirical premises. Some isopleth maps and fractional indices have a quantitative appearance but lack mathematical soundness.

[10] Passarge, "Grundlagen der Landschaftskunde," 1920.

[11] J. G. Granö, "Reine Geographie: Eine methodologische Studie beleuchtet mit Beispielen aus Finland und Estland," 202 pp. Helsingfors, 1929.

its geological implications for my purposes and throwing out those that do not apply. Stratigraphic suggests a series of strata or planes, as illustrated in the accompanying diagram. The strata are the equivalent of sub-landscapes which together constitute a total landscape.[12] The stratigraphic view reveals in these different sub-landscapes their important areal quality. Their succession as parts of a total landscape preserves the concept of interrelationship. Thus we recognize in our diagram (1) a physiographical plane or horizon resting upon a geo-morphological base, and (2) other horizons in accordance with the circumstance of the region under investigation.

The planes may be resolved with any or all others in the series. Some planes may be discontinuous, as illustrated by that one for natural vegetation, but all fit into their proper places when they are resolved. Furthermore, these planes, either separately or combined, may be compared with those of other distinct units or regions. This possibility satisfies the comparative philosophy in geography. The serrate edges of the planes imply that boundaries of regions are not mathematically fixed nor are the shapes of the regions necessarily symmetrical. Their extent is limited only by their homogeneity.

"A Stratigraphic View of Geography" does not imply a new kind or phase of geography, but rather is an attempt to vivify the structure of geography. Emphasis is placed upon the important phases of geography, namely, areal description, functional interpretation and comparative relationships and at the same time we keep all the science rooted in the physical earth. The stratigraphic point of view may serve as a guide or control to a systematic approach to geography, to prevent the investigator from straying along tangents and to keep before him constantly the elements which have been here listed as the objectives in geographic research.

OBITUARY

GEORGE WILLIAMSON, 1857–1936

GEORGE WILLIAMSON, professor emeritus of biology and curator of the George Williamson Museum at the Louisiana State Normal College, died at his home in Natchitoches, Louisiana, on January 10, 1936. Professor Williamson was not a research worker, but his service to science, and the natural sciences in particular, was of such outstanding value that a short sketch of his life merits the attention of his more specialized colleagues, who labor in a different manner to advance the borders of knowledge.

Mr. Williamson was born on Dunboyne Plantation, Iberville Parish, Louisiana, into an economic and social régime then on the verge of the war which was to mean its demoralization. One of his earliest memories was the news that his father, Colonel George M. Williamson, then serving under General Beauregard, had been badly wounded at the Battle of Shiloh. After the war, he removed to Guatemala, where his father was envoy. A few years later he went to Germany, by way of Cape Horn, and spent two years there. In early manhood he returned to Louisiana.

The young man's early schooling was by private tutors, and although he twice enrolled in college he never completed the course. Nevertheless, his native intelligence and scholarly habits soon distinguished him from his fellows, and in 1883 he became principal of the first state-supported high school in Louisiana, at Grand Cane. Here he began his collection of Louisiana Indian artifacts, which is to-day probably the best extant. In 1897 he was called to the Louisiana State Normal School at Natchitoches to the chair of biology, the position he filled actively until 1931, when he was made professor emeritus and curator of the George Williamson Museum, which he founded and developed, and which the college had named in his honor.

In years of service Professor Williamson was Louisiana's oldest teacher; in many respects he was her most successful one. He created and nurtured a love of nature in the minds of many at a time when the South was in the stages of recovery and men's thoughts were generally on more material things. He possessed to a marked degree the ability to create in his students of general biology such a love for and lasting interest in nature that hundreds of them, years later and in many walks of life, wrote him for information or called scientific phenomena to his attention. His museum of plant and animal fossils, minerals, Indian artifacts and historical objects was in a large measure built up by the unsolicited gifts of former students. He stimulated others to go into science, and some have made names for themselves in fields as widely separated as conchology and genetics.

Mr. Williamson's peculiar training and early experiences gave him an outlook all his own. He never lost the mannerisms and personal appearance of the Southern gentleman of another day. His lineage was of the best. He was descended from General Butler of the American Revolution, and was the great-grandson of Washington's adopted daughter, Martha Custis,

[12] Sauer recognizes but two phases of a landscape, namely site and the cultural expression.—C. O. Sauer, p. 29, University of Calif. Publications in Geography, Vol. 2, No. 2, pp. 19–53.