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The Functions of Geography in the Elementary School: A Study in Educational Values

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per second, or more than 300,000,000 miles annually. Although this has been going on indefinitely no observable change in the appearance of the star has taken place since scientific observations of it have been made. The reason is that this distance, great as it may be, is but an extremely small part of the vast distance between the star and us. Although Sirius is comparatively near us, as the distances to the stars go, it will be more than 800 years before a velocity of twenty miles per second will increase its distance by one per cent. Vega, the brightest star in Lyra and quite near the apex of the sun's way, and the sun, are approaching each other at the rate of about fifty miles per second.

Probably the sun is moving in a sensibly straight line, for the stars are so extremely remote that their attractive influences are quite inappreciable. It is not necessary to assume, as is sometimes done, that its motion is due to the attraction of other bodies, for this implies that it was originally at rest, an assumption which is by no means necessary, and not even probable.

One possible consequence of the sun's motion remains to be mentioned, and that is that it may some time encounter meteoric matter or even collide with a star. In fact, this outcome seems to be almost inevitable, ultimately. If a collision should occur, it would result in the destruction of the present system by the enormous amount of heat generated in the impact. The combined mass would become nebulous, after which it would undergo an evolution of cooling and shrinking. Indeed, it may be that our present system has evolved from a nebulous mass generated by collisions of earlier and smaller bodies than the sun. It is fairly probable that temporary stars owe their sudden intense luminosity to the heat generated by the impact of collisions of some sort.

THE FUNCTIONS OF GEOGRAPHY IN THE ELEMENTARY SCHOOL: A STUDY IN EDUCATIONAL VALUES

BY WILLIAM CHANDLER BAGLEY
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REDUCED to its lowest terms, education consists in giving to the individual experiences which shall modify his future adjustments with reference to certain social or moral ends. Such experiences may be imparted either directly (through the individual's personal contact with the environment) or indirectly (through language or some other symbolic medium for the transmission of experi-

ence). Such experiences may function either automatically (as habit) or consciously (as judgment or reason). The problem of the science of educational values is to determine the part which the various items of the curriculum play in this process. Given any subject of instruction, for example, the question must be answered: In what different ways will this knowledge be likely to function in future adjustments? This question answered, the detailed problems of method can then be attacked: How shall we teach this subject in order that it may efficiently fulfill its function? How much time and energy shall be allotted to this subject in comparison with other departments of instruction?

The increasing importance of geography in all stages of education renders the question of values especially important. Why has this subject so suddenly assumed a position of great importance, not only in the elementary schools, but also in the high schools, the colleges, and the universities? What has caused so marvelous a change in the status of a discipline which, only a few years since, was derisively termed "the sick man of the curriculum"? An answer to these questions immediately suggests itself: A knowledge of geography has been found to be of service to its possessor. What this service is, and how the "new" geography has come to render it efficiently, when the "old" geography was inadequate for this purpose, are questions that certainly merit careful consideration.

It is obvious that one's estimation of the value of geographical facts depends entirely upon one's connotation of the term "geographical." If we include under this term only those facts that were commonly made the subjects of geographical instruction twenty years ago, we must say in all candor that such facts have but a minimum of utility for their possessor—unless, indeed, he chance to be a sailor. If, however, we mean by geographical facts all the knowledge which man has accumulated concerning his environment and its relation to his life, then the question obviously assumes a different aspect. Thus defined, geography becomes the nucleus of all the sciences that deal with natural phenomena. But geography is something more and something less than a mere blending of these various departments of knowledge. It is both more and less than astronomy plus geology plus botany plus zoölogy plus anthropology. Twenty years ago this statement would not have been true, at least in so far as the geography of the schools was concerned. Geography at that time was but a mosaic of materials borrowed from the various sciences of nature. This mosaic was not in itself a science, because it lacked a unifying principle.

The very looseness of the old definition betrays this weakness: "Geography is a description of the surface of the earth and of its countries and their inhabitants."

The unifying principle which has made geography a science is Man. Not all the facts of botany are important in geography, but only those that are directly connected with man's welfare. This does not imply that a complete treatment of geography would not perhaps involve all the facts of botany, but these would be arranged and classified with reference to this unifying principle. The pure science of botany, on the other hand, takes no account whatsoever of this principle. To all intents and purposes, a pure science is a closed system.

This distinctively human view of geography was first clearly enunciated by the great German geographer, Karl Ritter, who died in 1859. It has only been within recent years, however, that the principle has come to be generally adopted, and even to-day there are some authorities who refuse to recognize the limitations which it imposes; but even the latter would probably agree that, for educational purposes, this view of geography is the most satisfactory. Mr. Redway has summed up the matter in the following words: "The question of the nature of geography is gradually settling itself into one that inquires into the proper basis and scope of the subject. During the past twenty years we have seen public opinion throw aside the notion . . . of geography as a 'description of the earth's surface,' and substitute therefore a very broad idea, 'the study of the earth as the home of man.' . . . If I felt called upon still further to add to the literature of definition, I should put it as 'the study of man and his environment,' or, perhaps, 'life and its environment.' "*"

If, then, we look upon geography as a study of the environment in its relation to the life of man, the *utilitarian* value that attaches to this subject is obvious from the outset. Broadly speaking, all life is adjustment to an environment. Anything that tends to render this adjustment more efficient is of value from the standpoint of utility. Whatever reduces waste, whatever saves time, energy, labor, whatever increases wealth and material prosperity may be looked upon as utilitarian in its value. That the facts of geography, as we now understand that term, possess such utilitarian value in a degree sufficient to warrant their wide dissemination is easily demonstrated. A few concrete instances will suffice to illustrate this point.

The process of distribution that is continually going on, tending to relieve the congested areas of the earth's surface and to populate the

* J. W. Redway: *Proceedings*, N. E. A., 1903, p. 155.

undeveloped areas, can take place either blindly or intelligently. In the former case, lack of accurate information concerning the conditions of different regions—their relative productivity, healthfulness, etc.—leads to a chance or fortuitous selection of favorable environments; that is, under conditions of geographical ignorance, migratory movements frequently entail a tremendous material waste, to say nothing of human suffering. Inadequate knowledge of climatic conditions, for example, led to the misfortunes that followed the wild rush into the semi-arid regions of Kansas and Nebraska in the early 80's. To-day the work of the various scientific bureaus of the national Government is devoted to the gathering of accurate information regarding the temperature, rainfall, fertility, and salubrity of various parts of the country. Annually a vast mass of information is collected, digested, and published—information which is, in its very essence, geographical knowledge. The pupil in the upper grades of the elementary school could and certainly should be made acquainted with the sources of this information and trained in its interpretation. The expense which is involved in the collecting of this data would be repaid in a generation, if the schools would see to it that their pupils know where to get at it and how to use it. In fact, a more intimate connection between the Department of Agriculture and the public schools is earnestly to be desired. In some instances a start in this direction has been made through the medium of the State agricultural colleges, but, as yet, it is only a start. The only possible objection that could be urged against such a correlation would come from wild-cat land companies that attempt to colonize unproductive regions. An examination of the advertising pages of recent magazines will demonstrate that such companies exist even to-day.

The merchant engaged in the export trade has no longer to send his vessels to distant shores on the chance that a market may there be found for his goods. The Consular Reports published by the Government give accurate information concerning the commercial geography of foreign countries—what goods are in demand, at what profit they can be sold, what duty must be paid for their importation, what commodities will not find a sale, and a host of other valuable facts which operate to reduce losses and increase profits. All this geographical knowledge is important, from a utilitarian point of view, to many different classes of people. It is knowledge which the merchant, the farmer, the manufacturer, and the legislator may frequently use to their advantage. And the laborer seeking a market for his labor may be just as materially benefited by such knowledge as the manufacturer seeking

a market for his products. Here, again, is a suggestion toward the making of geography practical in the elementary school. The writer once proposed this question to an eighth grade class that had been exceptionally well prepared in commercial geography: The Great Northern Railroad recently sent a representative to Asiatic Russia to study the Trans-Siberian Railroad; what motives led the management to take this step? A variety of answers were obtained, nearly all showing commendable acumen of thought. These were criticised by the class with the aid of suggestive questions, and finally the conclusion was reached that the Great Northern directors were anxious to know whether they could compete with Russia in supplying wheat for the oriental market. It is obvious that such a question of commercial geography is of vital interest not only to the stockholders of the Great Northern Railroad but also to the entire population of the northwestern States.

We have spoken so far only of the utilitarian value of detailed facts of geography. But the new geography, like all true sciences, renders deductive processes possible. From the facts are induced great principles which can, in turn, be applied to particular instances with reasonable certainty that the conclusions will be justified by actual facts. "All knowledge," says Professor Ostwald, "is prescience"; that is, the ultimate value of knowledge, as such, lies in the fact that with it one can forecast the future on the basis of the past. The value of the principles of geography, from a utilitarian standpoint, is as unmistakable as the value of detailed geographical facts. To-day we not only know, as a matter of direct observation, that certain regions are unsuitable for agricultural pursuits, but, given the contour of a certain region, given other facts of its topography, given a few hints as to its geological history, given the prevailing winds, and its distance from the sea, we can determine *a priori* its suitability for agriculture. There is, of course, a possibility of error. Actual test may overthrow the results of our theoretical considerations; but the chances are greatly in favor of their validity. An interesting example of a gigantic enterprise, based upon a *a priori* reasoning from geographical generalizations, is furnished by the recent exploitation of the water power of Sault Ste. Marie. All precedents seemed to justify the assumption that a great manufacturing and commercial center should grow up at this point. Its situation near the wheat fields of the Northwest, near the immense virgin forests of Ontario, near the unrivaled deposits of iron ore in the Lake Superior region; its facilities for water communication with the most populous centers of the continent; its proximity to the labor market

—all these conditions supplemented the extensive water power developed by the rapids of St. Marys River in warranting the rosiest pictures of the future. A large corporation was organized for the purpose of developing these resources. A canal was dug on the Canadian side—cut through the solid rock—to bring the water to the turbines at a convenient point. Factories were constructed on a scale hitherto unheard of in the business world. Steamer lines were operated on the lakes, and a railroad was pushed north into the forest to bring down pulp wood and iron ore. For a time everything went as anticipated, but a few months ago the entire organization collapsed. Some important factor, no one seems to know just what, had been overlooked. Possibly the results were expected too quickly; time was not allowed for natural development. But that the fundamental conclusion was valid—that a great city will sometime grow up at this point—no one seems to doubt, even after this disastrous failure.

Does the utilitarian value of geography justify the importance which this subject has assumed in education? Is it of value to special classes rather than to the average citizen? Should the study of geography be left, in the main, to the higher institutions? Every one must know how to read and write, how to compute, how to express himself effectively; could not the time of the elementary school be spent more profitably upon such subjects as these? Upon the basis of the above considerations, and bearing in mind the fact that the majority of children never get beyond the elementary school, these questions must be answered in favor of geography. The utilitarian value of geography, however, would not justify its preëminence in the elementary school to the neglect of these other branches. Nor is the utilitarian value the only value that accrues to its study. It adds an increment, and a large increment, to the total value of the subject, but very few disciplines rest upon utility alone. It is only necessary here to point out that the utilitarian value of geography is extremely important, and that our methods of teaching must be modified in some degree by this fact. To what extent they should be modified can be determined only by a comparison of the utilitarian value with the other values which geography may possess.

We know that the prominence of certain items of the curriculum is justified, not by the utility of their facts and principles in actual application to the problems of life, but rather by the condition that ignorance of these facts and principles brands a person as uneducated, and hence serves to militate against his maximal efficiency in society. The study of grammar is, perhaps, the best instance of a subject of formal instruction,

the main value of which is *conventional*. A sentence that is grammatically incorrect may express one's thought just as clearly as a sentence that is grammatically correct, yet habitual use of incorrect forms—disregard of conventional requirements—will distract the attention of one's auditors from the thought to the form, and hence will militate against the maximal efficiency of one's expression. The question now arises: In what degree will conventional requirements justify the teaching of geography in the elementary schools?

Geographical knowledge is certainly "assumed" as part of the intellectual equipment of every one who would claim for his thoughts and opinions the consideration of the average man. The man who does not know that the earth is round will surely be handicapped in his dealings with others; for, in social intercourse, men and women generalize upon slight bases, and the man who has proved himself to be ignorant upon so common a branch of knowledge as geography will receive scant attention upon other matters. The elementary school owes it to the individual to furnish him with those geographical facts and concepts that "every one must know." In this day, when "learning by heart" has been practically banished from orthodox pedagogy, it is especially necessary to emphasize this point. A number of facts must certainly be memorized for this reason if for no other.

In addition to the value of its facts in direct application to the needs of life, and in addition to its conventional value, geography has a peculiar value as a preparation for other subjects. A knowledge of geography is especially important in the successful study of (1) history and current events, (2) literature, and (3) natural science.

(1) "History is not intelligible without geography," says a recent writer.* "This is obviously true in the sense that the reader of history must learn where the frontiers of States are, where battles are fought out, whither colonies were dispatched. It is equally if less obviously true that geographical facts very largely influence the course of history. Even the constitutional and social developments within a settled region are scarcely independent of them, since geographical position affects the nature and extent of intercourse with other nations, and therefore of the influence exerted by foreign ideas. All external relations, hostile and peaceful, are based largely on geography, while industrial progress depends primarily, though not exclusively, on matters described in every geography book—the natural products of a country and the facilities which its structure affords for trade, both domestic and foreign."

* H. B. George: *The Relations of Geography and History*, Oxford, 1901, p. 1.

It should not be overlooked, however, that the relation of geography to history is, in some measure, reciprocal—that, while geography is essential to the understanding of history, history is sometimes no less important in the rational study of geography. It is perfectly obvious that the significance of many geographical facts depends in no small measure upon historical conditions. Boundaries between countries, for example, are important geographically, yet they frequently have no adequate geographical explanation and must be interpreted entirely from historical bases. This point is also illustrated by the location of certain cities, although here a geographical influence may often be traced through historical media. For example, the capitals of the South American republics in the Andes region (including also Venezuela) are all situated away from the seacoast in all but inaccessible mountain regions. The cause of this phenomenon must be sought, not directly in geographical, but rather in historical conditions. For generations the neighboring seas were infested with pirates, and cities on the coast were constantly subject to pillage and sack at the hands of these outlaws. Nevertheless, that this historical condition should have arisen is undoubtedly due to the operation of geographical causes.

Admitting the reciprocal nature of geography and history, however, it is plainly apparent that geography is the more fundamental, hence its greater preparatory value in connection with history.

The study of geography is also essential to the rational understanding of "current events." Not to evaluate current tendencies with some degree of intelligence is certainly not to prove oneself efficient in society. In this day when an occurrence on the other side of the globe may immediately and directly influence the humblest citizen on this side, the ability to read newspapers intelligently needs no elaborate argument for its defense. And the ability to read newspapers intelligently certainly involves not a superficial but a thorough knowledge of geography, as the contemporary happenings in the Orient abundantly testify.

(2) Geography stands in an intimate relation to the study of literature. The classics commonly read in the elementary schools—*Robinson Crusoe* and *Evangeline*, to name only two—could not be adequately appreciated without a prior knowledge of geographical facts. Just what weight should be attached to geographical study upon this ground is necessarily indeterminate, but this factor certainly adds an increment, and a large increment, to its total value.

(3) Rather more tangible is the relation of geography to the natural sciences. As pointed out above, geography borrows many of its facts

from different fields of natural science—from geology, meteorology, astronomy, botany, zoölogy, etc. In the high school and college each of these sciences is treated in and for itself as a pure science—that is, without explicit reference to its economic or human relations. It is obvious, however, that the initial study of a science should be from the human side. The child should be introduced to facts and principles in their relation to his life. This is what geography attempts to do. In a sense it might be looked upon as an introduction to all the sciences of nature. It is here that the child must get that first large view which should precede all detailed and abstract study—abstract in the sense of being considered apart from its human relations. Educators are now coming to believe that the curriculum should include geography not only as a preparation for the sciences, but also as a culmination of all scientific study; that is, an advanced course in geography should form the capstone of the science work in high school or college. The student should bring together the facts and principles that he has acquired in the detailed study of the various sciences, and discover their relations to human life. This is only a consistent application of the general principle that mind begins with large wholes, passes from these to detailed parts and then back again to the wholes—analysis followed by synthesis, differentiation followed by integration. In any case, however, we can not doubt that geography has great value as preparatory to the study of science, and that, if the student is to get the most from the study of science in high school or college, he must be thoroughly grounded in geography in the elementary school. Here, however, we are speaking for the few rather than for the many. To the majority of our pupils the initial study of geography forms the sum total of their scientific instruction. Therefore the preparatory value of geography can not be unduly pressed as a justification for its preëminence in the elementary school.*

The dividing line between *practical* and *cultural* values is indeterminate. What we have discussed under the head of utility is beyond doubt “practical” in the narrowest sense of the word. But conventional values become practical when we look at them from a certain standpoint—when we remember that conventionally valuable facts aid one in one’s social adjustments. The preparatory values are practical ultimately, provided that the subjects which they look forward to are in themselves practical. The values which we have now to discuss

* This would seem to indicate the fallacy of President Hall’s proposals for replacing geography in the grades with elementary science. Cf. *The Ideal School Proceedings*, N. E. A., 1901.

will doubtless appeal to one as ultimately practical, although with more intermediate steps than is the case with those considered above. Because of this distinction we may class the following as cultural values, remembering, however, that the distinction between practical and cultural is one of degree rather than of kind.

Acquisitiveness in man is an instinct. Like all instincts it owes its existence to the forces of natural selection working upon fortuitous variations in nerve structure. It has been good for man to be curious about his environment, to study his environment, and to determine the laws that govern it. Primitive man did not realize, probably, that his inordinate curiosity was good for him. In his own rude way he investigated things for the mere "fun of it"—for the pleasure which it afforded him. Later in his development he came to find out that many of the facts which he discovered and many of the laws which he worked out were "good" for him—that the knowledge which he had gained helped him in solving the problems of his life. But this appreciation of the value of acquisitiveness came only after a long lapse of time.

The desire to satisfy curiosity is thus seen to be at the basis of knowledge. The child evinces this desire. His curiosity is boundless, and upon this native instinct the educator may build. It is clear, however, that he can not trust to it entirely, for the very fact that it is an instinct means that it runs its course in passive attention. It is not sustained, directed, organized. All these things mean active attention, mean *work*. Curiosity soon tires, but any measurable addition to knowledge involves persistent effort.

It is the problem of the educator, then, to replace this instinctive curiosity with a higher mental process. The desire to obtain knowledge for the sake of knowledge is not to be discouraged, but it is to be held to a definite line until results follow. Wherever possible, the child's curiosity should be directed along lines that will help him most in his future adjustments. There are times, however, when this curiosity may be directed toward ends the practical significance of which is not once apparent, and it is these cases that we must discuss under the head of cultural values.

In the first place, some children may be curious in certain special directions. They may evince a desire, perhaps, to learn all that they can about Arctic exploration. The facts that they obtain from various sources may not be applicable to the problems that they must solve in later life, yet no sensible teacher would attempt for a moment to curtail this interest. He has here the opportunity to replace instinctive

curiosity with a higher sentiment, namely, intellectual interest. This is closely akin to other forms of sentiment, such as appreciation of art, music, and literature. None of these is, in itself, "practical," yet each subserves a very practical end. Without some form of pleasure, life would be impossible. If the higher forms of pleasure—the sentiments—are not developed, the individual will be thrown back upon the primitive pleasures. He will follow the instincts, the lines of least resistance. In our school work to-day we are trying to develop the aesthetic sentiments—to cultivate an appreciation for art, music, and literature. We should certainly not neglect the intellectual sentiment—the pleasure that comes from knowing. It is for this reason that the wise teacher would never think for a moment of curtailing interest in such a subject as Arctic exploration. The opportunity is too valuable to be lost. With a little trouble he may lead the child to take delight in an intellectual pursuit, just as with a little trouble he may lead the child to see the beauty in a great picture, or a classical musical composition, or a world epic.

In the second place, items of knowledge which have little or no significance in the practical affairs of life may nevertheless be necessary to a *system* of knowledge. It is a well-known fact that systematic arrangement or organization is an extremely important factor in the "efficient recall" of items of experience at times when they are needed.* Very frequently in making a system of knowledge—in arranging the items of experience in an orderly fashion—it is necessary to insert many facts and principles which have in themselves little practical value. Thus the individual may never be called upon to apply his knowledge of the Arctic regions, but such knowledge is necessary in order to make his world view comprehensive. Without it there would be a distracting gap.

The briefest examination of the curricula of the secondary schools and colleges will serve to demonstrate the importance of the "cultural" values which we have discussed in the two preceding paragraphs. The larger part of these curricula is made up of subjects which subserve one or the other of these two functions: tending either to develop intellectual interests or to make more comprehensive and complete the body of knowledge. The science, the mathematics, the language and literature, which occupy so prominent a place in the higher education,

* The importance of "thought-connections" in recall has been demonstrated, time and again, by the methods of experimental psychology. Cf. The work of Ebbinghaus, Steffens, and Lobsien.

can be justified only upon these grounds. In the elementary school, on the other hand, the cultural values are not so prominent. The bulk of the time is given over to the study of arithmetic and language, the latter including reading, writing, composition, and grammar. Literature and geography divide most of the remaining time between them. Arithmetic and language are justified principally because of their utilitarian values. Literature is prominent chiefly because of its conventional and cultural values. Geography might be said to occupy a midway position, being important from all sides.

If the foregoing analysis of the aims and functions of geography as an integral part of the elementary school curriculum is valid, it follows that our methods of teaching must be organized with these points in view. If possible, the various aims should be classified with reference to their relative importance in fulfilling the general end of education, namely, the production of the socially efficient individual. We should know with approximate accuracy just what facts and principles are to be impressed because of their utilitarian value, what are essential from the conventional standpoint, what from the preparatory, and so on. In many instances the groups will, of course, cut across one another, but it seems tolerably clear that methods of impressing facts and developing principles will vary according to the function which the facts and principles are to subserve.

These are problems which it must be left for educational research to solve. From the standpoint of the practitioner, at least, this suggests a field of investigation infinitely more promising than those which contemporary educational experts are attempting to exploit.

GEOGRAPHICAL NOTES

Wind-Blown Trees.—The communication on *Wind Effects*, by Prof. M. S. W. Jefferson, in your January number, interests me much, as it concerns a subject to which I have given some attention for several years. Observations of the kind to which your contributor refers are easily made, and add much to the interest of the study of meteorology, because they give it life. If any of your readers cares to pursue this subject further, he will find an instructive discussion of it in a recent paper by Prof. J. Früh, entitled *Die Abbildung der vorherrschenden Winde durch die Pflanzenwelt (Jahresber, Geogr. Ethnogr. Gesells., Zürich, 1901-02, 97 pp.)*. In this study Professor Früh classifies the effects