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GEOGRAPHY AND LIFE

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THE leading consideration concerning all life is self perpetuation. The inalienable right to live is the most impressive thought revealed in nature. Dearness of life is the sole cause of the universal conflict in the organic world. A superficial glance at nature reflects the harmony and tranquility of a "daisied field in June," but a more careful scrutiny convinces us that the realm of nature is the scene of a warfare "utterly shameless and utterly cruel." "Long life and length of days" come only to the creature whose environment is favorable to its needs. Either organisms find desirable homes and congenial company, or vanish from the earth altogether. The security of life is contingent upon environment. The interesting adaptations of plants to secure sunlight, water, and food; and of animals to secure food, and for rivalry and defence, establish the fact that dependence characterizes every organism by determining its nature.

Animals derive food either directly or indirectly from plants, for they alone possess the important function of organizing inorganic materials. Since the two kingdoms must occupy the same dominion, the struggle for existence is made more intense. But plants, in turn, are dependent upon proper conditions of temperature, moisture, and soils. The temperature of any region leads to a consideration of the sun and its effect upon earth and atmosphere; moisture takes into account the aqueous envelope as affected by heat and winds; and soils result from the combined action of all these factors and forces upon the rock crust of the earth. Plants do not thrive in regions where the temperature remains long at or below 32°, as water is necessary to dissolve and transport nourishment. A meager precipitation of moisture, for a similar reason, stunts plant growth; but with sufficient moisture and a high temperature, there is scarce a region in the world that would not "blossom as the rose."

A consideration of man's distribution and development reveals positive evidence of his response to physiographic conditions. Temperature and moisture are chief among these, not only because they affect him directly, but because they determine the productiveness of habitable areas. The progress of civilization leads to the conclusions (1) that range and variation in climatic conditions are favorable to civilization and culture, and (2) that extreme and uniform conditions are unfavorable to the advancement of civilization.

Tropical regions support a luxuriant vegetation in response to high temperature, liberal rainfall and alluvial soils. The food supply is generous and were it not for other less favorable conditions a dense population might flourish. The range of temperature is scarcely more than ten degrees, and, in addition to the enervating influence upon human beings, it permits an uninterrupted plant growth, insuring abundant food with but little expense of human energy. The rank vegetation becomes a barrier which man declines to penetrate, partly because intertwining plants and vines obstruct his path, and partly because this tropical verdure harbors a dreaded animal and insect life. Resistance to life, so far as food and shelter are concerned, is reduced to the minimum; the palm alone may furnish all that human life demands for mere subsistence. Excessive heat causes man to languish in the shade; excessive moisture breeds disease and makes cultivation difficult. The uniform climate and unlimited varieties in vegetation become monotonous and oppressive. Plant life holds the scepter! Man is over-awed with the fierceness and regularity of environing conditions. Long subjection has brought with it resignation and mental decadence. What wonder that the infantile mind should reverence forces so irresistible as scorching suns, angry skies, gigantic trees and ferocious beasts! What wonder that man should abandon a struggle for supremacy in which the odds are so against him!

Civilization is also in a low stage in the Arctic Regions. The Eskimo's struggle for existence is so intense that all human effort is expended in extorting from nature a meager support. If we reflect on the conditions of his environment, we shall discover the most depressing monotony: the long silent night with only lurid gleams of light; the illimitable expanse of glacier ice; the absence of vegetation; the desolate climate; the few species of animal life; surely, his is a "universe of sky and snow." Here, again, nature outbalances man, and ambition is weighed down by conditions so monotonous, that no excitations appeal to him except those for food and shelter. Even the food that he eats so lacks variety that the building up of a sensitive and susceptible organism is impossible. He is as stolid as the world in which he dwells. Being driven for long periods to his home by the rigors of the clime, his emotional nature responds to enforced retirement and hence he manifests a strong love for home and family. Surely his is a case of arrested development; growth in intelligence demands at least some surplus energy after a mere livelihood is insured.

Temperate regions are characterized by a great range of temperature and a varying supply of moisture. A rigorous climate demands well built homes and warm clothing; short summers demand great activity in order

to mature crops; indigenous food-plants do not abound; soils produce only when carefully cultivated; woods are relatively scarce; metals are abundant but often difficult to obtain; and mountain barriers frequently separate productive areas. The variety of influences in environment demands versatile and symmetrical development. Even sudden weather-changes stimulate mind and body. Life becomes abundant only when it establishes many relations. Intellectual life is quickened in the consideration of that which is economical and advantageous. Rivalry and competition make life strenuous. Just as the equable temperature of the Tropics minimizes man's needs and leads to responses that are uniform, so the temperate realm multiplies the necessities of life and brings a variety of responses. The high temperature of summer, following a severe winter, is a powerful stimulant, and the reactions which lessen the tension come in the form of linen clothing, electric fans, manufactured ice, open cars, railroads to mountain retreats and seaside resorts. So millions of men are busy because the sun has mounted higher in the heavens.

According to Herbert Spencer life is the process of establishing an equilibrium with environment. The more intricate and complex the equilibriumal processes become, the higher the degree of life and the higher the scale of civilization. In low forms of life the adjustments to environment are simple, and the accommodations are largely effected by the organisms themselves. Every animal must respond to the demands for food and protection from enemies, or become extinct. The tropical inhabitant adjusts himself to his surroundings almost completely; he lives in caves or in the shelter of trees, wears little clothing and subsists on fruits, roots and insects. He is a direct response to an equable climate and a highly productive soil abounding with indigenous food-plants. Provision for the future is unnecessary, hence irresponsible and indolent habits are consequent reactions. Inactivity and stupidity are direct responses to conditions that make life easy. So nature, here violent and monotonous, outbalances a manhood that places little value upon an existence that is so generously bestowed.

Re-creation of environment is the test of enlightened civilization. In the lower stages of civilization, man stooped to adjust himself to nature and so became enslaved; but in highly civilized races, men have developed tastes and needs which nature, alone, cannot satisfy. So human ingenuity and discovery are summoned to transform material resources, and the work of nature is consummated with an artificial touch, which makes it serve more perfectly, a fastidious people. All arts and industries, all crafts and trades have, in the end, a single function to perform; viz., the promotion of natural resources to greater usefulness. But all modifications of material

resources demand an intellectual alertness which marks progress in civilization.

It is interesting to trace out the history of localized industries, and one is soon convinced that favorable productive conditions coupled with advantageous means of distribution, are the determining factors. To one who has studied geography aright, it is unnecessary to explain why cranberries are grown on Cape Cod, tobacco in the Red Sandstone Valley of the Connecticut, rice in South Carolina, or wheat in Minnesota; or why locomotives are made in Philadelphia, plate glass in Pittsburgh, furniture in Grand Rapids, cotton goods in Birmingham, or pottery in Trenton. Suffice it to say, that industries slowly but surely spring up in the regions well suited to their development. Frequently, where conditions are adverse, men triumph over nature's barriers to civilization, as when they tunnel mountains, connect oceans with watery threads, turn the course of rivers and moisten arid lands. Nature deals out her wealth with moderation in temperate zones and to them only who would "subdue and have dominion" over her. Life is dear because it has been purchased by incessant toil, and it is versatile and abundant because, in the struggle, it acquired knowledge, sympathy, judgment and mercy.

The trend of industrial history is determined by physiographic conditions. Man can modify his environment but he cannot annihilate it. In general, prosperity is coincident with a wise adjustment to geographic conditions. Chief among these are climate and soils of which much has been said. But land forms, themselves, exert important controls over industrial life. A general distribution of mountain ranges parallel to seas makes narrow coastal plains; close parallel ranges enclose inter-montane valleys; in the midst of the sea, volcanic disturbances project habitable lands; the subsidence of continental margins is responsible for numerous head lands and adjacent islands; and great rivers build and moisten far-reaching food plains. Hence it is that these earth processes fashion restricted habitable areas, while unrestricted areas result from the evaporation of large water bodies, or from the diastrophic tilting or lifting of extensive sea-floors. Broadly speaking, habitable lands are restricted or unrestricted and a review of industrial life makes the following inductions possible: (1) Restricted habitable areas determine industries in which a maximum of labor is expended in the production of a minimum of material. (2) Conversely, unrestricted habitable areas determine industries in which a minimum of labor is expended in the production of a maximum of material.

The operation of this principle is reflected in the character of the people. The Norwegians, hemmed in between the mountains and the ocean, were

long dependent upon the fishing industry, and years at sea developed them into the boldest and most famous of seamen.

When a yard of Belgian hand-made point-lace is sold, ninety-five per cent. of the purchase price is for labor; the value of the raw material used is insignificant. In order that nearly five hundred people may live on a square mile, the highest possible utility must be given every production, by the expenditure of much labor upon little material. In Switzerland, where metals and woods are scarce, hand-made watches and ingeniously carved toys illustrate how a dearth of material may be transformed into great wealth through the application of much industry. Unusual skill, strict economy, and extreme perseverance are the characteristic responses in the people. Restricted tillable areas near Boston and New York stimulate truck-farming because an acre so employed furnishes a maximum of labor, the compensation for which comes when a limited quantity of choice seasonable vegetables finds a ready market.

Not only to industrial life does the principle relating to restricted areas apply, it extends also to political history with most decisive results. As England's tillable lands are much restricted, her own soils have long been unable to support her rapidly increasing population. In 1815 the Corn Law was passed to protect the English landlord. Under this obnoxious measure, the price of wheat in 1817 reached \$3.25 a bushel, and the same year the weekly wage of a weaver was \$1.02. The struggle for free trade soon followed. The exorbitant price of wheat added to the misery of the under-fed laborer, and the tariff interfered with commerce. Manufacturers demanded free trade because they saw clearly that a more abundant food supply would increase the spirit and efficiency of the workmen, and would also tend to keep labor cheap. Had England's territory been sufficient to furnish food for her millions, the great political struggle that wrenched the very life of England, might have been averted. The misery, suffering, and abject poverty of the people enlisted the sympathy of noble hearts, who condemned a policy that caused "wealth to accumulate and men decay." Poets, reformers, and statesmen championed the cause of suffering humanity, and finally in 1846, Robert Peel through motives altruistic, or otherwise, deserted the Tories and introduced the bill which sealed the doom of the Corn Law and marked the beginning of free trade of England. So in America, geography is peculiarly interwoven with history. The coastal plains, with their rich soils and warm moist climate, must answer for the Civil war, says Prof. Davis, for these conditions made slavery profitable. Ultimately, the economic resources of the South are responsible for the direful social and industrial situations of the present day.

In areas where the resources are unrestricted, the industrial problem is very different. In contrast to the Swiss, who makes a few ounces of metal into a watch worth ten dollars, or the Belgian, who converts a handful of flax into a yard of point-lace worth its weight in gold, the Pennsylvanian makes from his unrestricted resources, iron and coal, locomotives and steel rails. The problem of the Illinois farmer is the production of a maximum yield with the minimum investment of labor. A load of corn which brings \$25, shows at least a return of \$20 for material and the balance for labor. Dealing, as he does, with produce in great bulk, he becomes wasteful and extravagant. If, instead of Illinois' eighty people to the square mile, it had Belgium's four hundred and ninety, no longer could "half a tillage stint" our prairie plains. No half-cultivated farms, no weedy fence corners, no peaty swamps or alkaline tracts could exist. Agriculture in the past has been easy. Owing to its great possibilities, "man has had only to tickle the soil with the plow and it has laughed with a harvest." But in his greed to get bountiful returns, with little outlay of labor and capital, man is fast reaching a point of limiting returns. Because of reduced fertility, a point is reached at which a given outlay of labor and capital, fails to produce a proportionate yield. Here the study of geography touches life most directly! It is only through an understanding of soils, and a knowledge of the treatment by which their fertility can be maintained, that this point of limiting returns can be pushed farther into the future. So the agricultural college becomes a necessity, and the calling of the scientist is dignified by his reduction of "farming" to scientific agriculture.

Has too much been said concerning the influence of *geography* upon life, and too little concerning the *value* of the *study* of geography as presented in our schools? The educational tendency is emphatically toward a training that touches life in practical, rational, and vital ways; hence the value of any study must be measured by its contribution to fulness of life. That man is best educated who best understands his environments, who most clearly recognizes his relationships and responsibilities to all other life, and who best uses his resources to promote the common weal. Every science deals with some phase of man's environment, and geography, which is a department of science, deals in a general way with the same subject-matter. Any study which aids in giving man the correct view of his place in nature is of great value either from the practical or the cultural point of view; for, indeed, culture to be worthy the name, must manifest itself in the everyday life of a people.

The revelation of truth is one of the chief functions of all education. Superstition and tradition have ever blocked progress. Geography has

assumed its share in the task of disseminating knowledge. A Genoese visionary, starting out to prove the rotundity of the earth, discovered a new world; Magellan consummated the unfinished task of circumnavigating the globe; the next great triumph of truth came in the middle of the sixteenth century, when Nicholas Copernicus bequeathed to science a solar system. With the contributions of Herschel, Laplace, Ritter, and Guyot, we might think the work of geography complete. But again comes the question more pointed and specific: "How can I, at the country cross-roads, influence life and character through Geography?" Seek the answer in this: shall men and women of the next generation be filled with "wisdom and understanding"; and shall they be free from the bondage of superstitions that distort and terrify life, then must the children of to-day be convinced that moons neither help nor hinder the growth of plants, nor affect the amount of rainfall; that soils, the chief source of man's wealth, are the repositories of plant-foods which unwise use may exhaust all too soon; that cyclones possess decided economic value since to them we are chiefly indebted for our copious rains; that the "magician chlorophyll, conjuring with sunbeams" breathes life into dead matter and makes an animal kingdom possible; that birds and bees labor incessantly in making man's harvest abundant; that the chief use of the earth-worm is not to veneer a fish-hook, but to enhance the resources of the soil by keeping it rich and porous; that even invisible organisms render the highest service to man, as when bacteria accomplish the fixation of nitrogen in leguminous plants; and finally, that the forest, the nature-given heritage which man has so wantonly devastated, serves man directly in a score of ways, and indirectly it enriches and protects the soils, prevents disastrous floods, secures constant heads to our streams, breaks the biting blasts of winter, and makes beautiful landscapes that otherwise would be barren and monotonous.

Even above the value of practical knowledge, the student of nature may discover the steadfastness and immutability of God's law. He may be convinced that retribution follows its transgression, in the physical as in the spiritual world, with unfailing certainty; and finally, that to him who is in harmony with nature, and therefore most likely to be "in tune with the Infinite," shall come "length of days, riches and honor."

There are still people who believe the earth to be top shaped or pear shaped. This should warn us to use a globe freely in our class rooms; to illustrate the globular form of the earth, not merely to talk about it.