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Some Points in the Geography of South America

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the teacher and unconsciously accepted by the pupils as the beginning of a great collection, to which each pupil ought to add all through his life. It is not easy to give general rules that will guide a teacher in work of this kind, because the work must depend on the local opportunity. Nevertheless the illuminating idea of the sufficient antiquity of the earth for the production of its visible features is one that ought to be planted early, so that it shall develop and expand all through the course of geographical study; not as the belief of some unknown learned men with whom the pupils have no personal acquaintance; not as a vague abstraction, disconnected from the experiences of every day life; but as a living truth, the evidence of which is plainly visible out doors; a truth with which the growing pupils should come into increasing contact as long as they live. Certainly any teacher ought to feel free to add the geological aspects of earth-age, if he desires too; but in so doing he ought not to think that he is teaching geography or that he is answering the question: How old is the Earth? The object of gaining some truly geographical understanding of a problem of this sort is, for teacher and pupil alike, not that it shall be locked up and neglected in some back corner of the memory, but that it shall enter more and more into the lively appreciation and if possible into the high enjoyment of the earth on which we must dwell.

SOME POINTS IN THE GEOGRAPHY OF SOUTH AMERICA

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THE CONTINENT AS A WHOLE

EXTENT—In a north-south direction South America has an approximate length of 69 degrees or 4600 miles and a width of 46 degrees or 3200 miles. In extreme dimensions it is about 250 miles longer and 100 miles narrower than North America. It ranks fourth among the continents in size, seven million square miles being a round figure for its area. This is between an eighth and a seventh of the total land area of the globe. Triangular in shape, and largely lacking in coastal indentations, it is one of the most compact of the continents; its periphery is only about twice that of a circle of the same area.

Surface—Like its northern neighbor, South America has three main physiographic regions; (1) the eastern highlands, which are divided by the Amazon into two parts, those of Brazil and those of Guiana, and constituting about one seventh of the area of the continent; the Brazilian portion at present carries about one-third of the total population of South America. (2) The western highlands, made up of lofty parallel mountain ranges with plateau areas between. From latitude 14° S to 23° S these ranges are some 400 miles apart and between them is a plateau 100,000 square miles in area and averaging 12,000-feet in height. This plateau is the only considerable interior drain-

age basin, and, aside from the difference due to the greater elevation, it is comparable to our Great Basin. The Western highlands have twice the area of the eastern. (3) The central lowlands make up approximately one-half of the continent's area. This vast plains region extends the length of the continent and has three distinct sections bordering on the ocean.

In addition to these three main physiographic regions there are two smaller ones, the Atlantic slope with an area of about 150,000 square miles and the Pacific coastal slope of approximately 350,000 square miles. These vary in width from practically nothing to 100 miles, and their interior border is sufficiently abrupt to make the ascent into the interior difficult. Thus the early colonists of Brazil were confined to the coast in the same way that the English colonists were in eastern North America.

The average elevation of the continent is estimated at 2,000 feet, the same for North America. But South America has little land of moderate elevation. Two-fifths of its area does not exceed 600 feet above sea level as against one-third for North America and Europe, one-fourth for Asia, and a much smaller fraction for Africa and Australia. Then it goes to the other extreme, the fractional part of its area above 10,000 feet being greater than for any of the other continents.

Climate—South America is a two-zone continent and as such is limited in its climatic types. And since over five-sixths of its area lies within the tropics there is a relatively small portion where a variable climate may be expected. General storms, as we know them, are not encountered until the latitude of Buenos Aires is reached, so that a large percentage of the people do not know what a general storm is.

In the arrangement of its great mountain systems South America is fortunate; those ranges that are high enough to affect the rainfall greatly are on the lee side of the continent with reference to the winds, resulting in a relatively small amount of desert land. Close to four-fifths of the continent is at some time during the year within the trade wind zones and but one-sixth lies within the prevailing westerlies. This latter area, a little more than one-third as large as the United States, is the only part of the continent favored with the cyclonic type of storm.

There are places—notably northwestern Chile—where no rain falls for years, and others where the rainfall is excessive. For the continent as a whole the rainfall is ample, and there is the further advantage that the larger portion of the rain occurs during the growing season; indeed, in large areas the occurrence of the rains rather than the temperatures determines the growing season.

Temperatures are probably not as high in South America as we of north temperate latitudes generally suppose, nor are the highest temperatures there found near the equator. The average maximum recorded, 104° F., occurs in Paraguay. The average maximum for North America is 113° F. and that for

Asia is still higher. The average low temperatures for a given place are generally not as low as the latitude would warrant. The difficulty in the equatorial sections as regards temperatures is not so much a matter of extreme but rather of long continued heat with a high relative humidity. On the equatorial lowlands the daily range of temperature may be 20° F. or more, while the average annual range may be only half as much. Of such a region it has been said that the days are the seasons. Countries so situated are deprived of the invigorating effects of our seasonal variations. It is in this respect that the equatorial climate offers a serious drawback to occupancy by the white race.

Frost occurs throughout the length of the Andes; it occurs every year in the Brazilian highlands, and on the lowlands from central Argentina south.

The constant high temperature and the abundant rainfall which occur throughout large areas of South America give to it a most favorable type of climate for the growth of vegetation. Up to the present time the very luxuriance of plant life has been in many sections a serious drawback to their development. The native with his primitive tools is unable to keep the undesirable plants weeded out because of the very rapidity of their growth. Railroads within the rainy tropics find the task of keeping down the vegetation on their right-of-way a serious one.

The Soil—Where the land is cultivable the soil is said to be less fertile than in similar situations in this country. A large percentage is laterite, the residual soil from weathered granites; that of the lowlands of the Orinoco and of the Amazon is alluvium, and a relatively small amount is of glacial origin. But a soil of only average fertility in a region of ample rainfall and of uniformly high temperature throughout the year will produce abundantly. In the combination of soil, temperature, and rainfall South America has a potential agricultural productivity that will bear comparison with the most favored of the continents.

Agricultural Products—The extent in latitude and the range in elevation give to the continent a wonderfully wide range of agricultural products; in some places the whole gamut of crops may be run within a few miles. Thus, Ecuador produces bananas, rubber, cacao, coffee, sugar cane, cotton, maize, and wheat. The variety of products is well illustrated in the number of plants "useful for alimentary, medicinal, and industrial purposes South America has given to the world. They are the potato, manioc, yam, a species of bean, tomato, guava, mate, pineapple, epicacuanha, and tolu balm."

Mineral Resources—It was its wealth in precious metals that first drew Europeans into South America. While the value of gold and silver that the mines have yielded can never be known, it must have been enormous, since the silver mines of Potosi are estimated to have produced \$1,500,000,000 since the Spanish occupation. "From 1540 to 1760, a period of 220 years, the gold mines of Bolivia produced \$2,100,000,000." The baser metals are found in

great abundance also, but the deposits have not been exploited so extensively as have the gold and silver. Rich deposits of copper and iron are known to occur in Peru and Bolivia, and the rich iron ores of Brazil equal the best of the Lake Superior region in quality. So far as present knowledge goes the continent is poor in mineral fuels and their absence will doubtless always be a drawback to the industrial development of the nations there. The continent is unique in its great abundance of nitre deposits (nitrate of soda). Chile derives practically all the revenue necessary to maintain its government from the royalties on the nitre sent out of the country.

Communication—As with the other continents, so in the case of South America, there are factors that make for ease of outside communication and others that hinder it. Of the former may be mentioned (1) the facing of the continent toward the Atlantic, the ocean of commerce, (2) the deep penetration of the continent by three great river systems, (3) the low divides between these river systems, and (4) the position of the continental divide near the Pacific, one of the tributaries of the Amazon being navigable to within 350 miles of the latter ocean.

Of the unfavorable factors there are, (1) the isolation of the continent, (2) its general compactness, (3) the evenness of the coast line, (4) the paucity of good natural harbors, (5) the fact that the most desirable portions from the standpoint of habitability are the least accessible, and (6) the obstacles incident to a hot, moist climate, such as fevers and other diseases.

People—Until latitude 20° S is reached the greater number of the people are found on the plateaus, but from thence south the lowlands are the more populous. The great Amazon lowlands, a most productive region naturally, is the least thickly settled. Three of the Brazilian states situated in this section make up 52 per cent of that nation's area and but 5 per cent of its population. This grouping of the people with reference to the altitude is in the main a response to climatic conditions.

South America offers a most interesting study in the relations of the races. Of the total population of 45,000,000 reliable estimates give 9,000,000 pure Indians, 13,000,000 mestizo, or half breeds, 15,000,000 whites, and 9,000,000 negroes and mulattoes. Most of the blacks are in Brazil, but some are in Venezuela and Guianas.

While the Indian and the negro occupy a lower plane than the whites, it is not because of race but of condition for "the distinction between the races is in Spanish-American a distinction of rank rather than of color. Against intermarriage there is, therefore, no more feeling than that which exists against any union palpably below a man's or a woman's rank in life. Except perhaps in a few of the oldest cities, a mestizo counts as white. Thus one may say that there is no color question in South America." Because of the small percentage of the superior race, the result of the amalgamation of the races there going on must result in a people inferior to the whites. Of the better

class of South Americans it is said that "they are superior to us in the sense of beauty and the appreciation of the artistic and inferior in material development and public education."

COUNTRIES OF SOUTH AMERICA

For present purposes a brief discussion of three of the South American nations that are fairly typical will suffice.

Brazil is one of the major countries of the world. As regards contiguous national territory it is exceeded only by Russia, China and Canada. It probably has more unexplored area and greater possibilities for future development than any other nation. The single state of Amazonas, which is but little explored and practically undeveloped, is larger than the combined areas of Great Britain, France, Germany and Italy.

Because of its situation on either side of the equator, Brazil has the least climatic range of any large country. Nine tenths of the total area lies within the tropics, and the climate of the extra-tropical section is very mild.

The narrow range of agricultural products which the mild climate would imply, are somewhat extended by the elevation of the highlands. Cotton and maize are grown successfully; and at present the authorities are encouraging in every way the production of wheat so as to stop the importation of flour. While the results so far are rather indifferent they are hardly conclusive. In time it may prove a strong competitor to the United States in cotton growing. Brazil takes first rank among the nations as a producer of rubber and of coffee, the latter being the more valuable. It produces 75 per cent of the world's coffee. In no other considerable nation does financial prosperity hinge upon a single crop so completely as it does in Brazil upon coffee. Coffee is said to form 90 per cent of the wealth of Sao Paulo, a state twice the size of Wisconsin.

About half the population of South America lives in Brazil, and of this half there is an "equality if not a preponderance of Negro blood." It is the only nation of the continent not settled by the Spaniards. One writer says of the Brazilians that they are lazy but ambitious, cordial, kindly, hospitable; that they could teach us much in the way of culture, of innate love of the artistic, and of the appreciation of beauty.

Argentina—Of the nations of South America Argentina is in many ways the most advanced. Though second in size it is but little more than one-third the area of Brazil. Commercially it ranks first.

A flat country with much grass land, Argentina early became a great cattle producing nation, and for some time it has been a strong competitor of the United States and of Australia in supplying Europe with meat. Of late years the percentage of land given over to cultivation has increased rapidly, the level nature of the country together with its treeless condition favoring the use of modern machinery for large scale cultivation. As an exporter of maize and of wheat it ranks first among nations, it having recently displaced the United States. In the cereal growing section but 14 per cent of

the available land is under cultivation and there yet remains 170,000,000 acres—five times the area of Wisconsin—to be developed. In view of her present rank as an exporter of maize and with so large an area yet to be given over to their cultivation and wheat, it appears that Argentina is destined for a long time to play an important part as an exporter of these crops.

Argentina has a sufficient range in climate to allow it to produce both tropical and temperate products, and agriculturally to become self sufficient.

Unfortunately the nation is poorly supplied with mineral fuels. The lack of these together with the large soil resources indicate that her interests are to continue to be of the agricultural sort. At present about 75 per cent of the total population is in the cereal region, which contains but one fourth the total area.

In Argentina we have an unusual case of a large, new agricultural country having a fifth of its total population in a single urban center. Turner says, in substance, that we have no cities in North America that can compare with Buenos Aires in cleanliness, city water supply, streets, and unity of architecture, and that very few European cities can compare with it.

Ecuador is typical of several of the South American nations. One way in which it stands as a type is its notoriously bad and unstable government. This naturally keeps away the capital that is so necessary for the development of the country.

Though situated in equatorial regions, because of its mountain and plateau areas, we find it producing temperate zone products in considerable quantities. Thus it produces practically all the wheat and corn, it needs. In addition it exports coffee, rubber, and one-third of the world's supply of cacao. Because of its range in altitude Ecuador has agricultural possibilities similar to those which Argentina derives from its range in latitude, that is, the ability to become self-sufficing agriculturally.

Ecuador is typical of equatorial South America in that the majority of its people live on the uplands. The hot, humid lowlands produce the more abundantly but the uplands are the healthier. Quito, a city of 80,000, is at an elevation of 9,000 feet, and it "is accounted by all travellers in what relates to climate and picturesqueness one of the most charming capitals of South America."

This is one of the South American nations that should be greatly benefited by the Panama canal. The present all water route from New York to Guayaquil is 11,470 miles and requires 60 to 74 days; when the canal is opened this will be shortened to 2,900 miles and 8 or 9 days. The commercial stimulus which the canal will give to western South American nations will undoubtedly tend to make their governments more stable, which again will mean more production and more commerce.