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# Evolution and Development of Geographical Knowledge in Puerto Rico

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## HISTORY

Geography, as a discipline, arrived in Puerto Rico with those explorers that accompanied Christopher Columbus in his second voyage, during which, on the 19th day of November, 1493, for the first time, Europeans visited the island, then called Boriken by the native population. Although Columbus' description of Puerto Rico is not very precise, the general consensus is that these Europeans landed somewhere along the west coast of Puerto Rico. The Spaniards' visit, however, resulted in the inclusion of the island in Europeans maps. Juan de la Cosa's 1506 map of America and Diego de Ribero's 1529 map of the Western Hemisphere placed the island of Puerto Rico in its correct location (Allen, 1982).

The first efforts to develop the level of geographical knowledge were initiated as a result of Juan Ponce de León's decision in 1508 to colonize Puerto Rico. It was then, in fact, when the name of Puerto Rico (Rich Port) was first used, not for the island, but for the area on the west side of San Juan Bay. And indeed, it was a «Rich Port»: gold was exported from there and many visitors arrived for business and/or settled in the vicinity of Caparra, the largest settlement at that time and further west from San Juan Bay.

The most important geographical work during the first century of colonization was Oviedo's (1547, 1970) *General History* and *The Conquest and Settlement of Puerto Rico*. Later, in the 17th century, Abbad and Lasierra (1970) wrote his *Historia Geográfica y Civil de Puerto Rico* (*The Geographic and Civil History of Puerto Rico*). This book presents the level of development and conditions of the existing towns, population, housing and infrastructure. It also describes the customs and economic activities of Puerto Rico's inhabitants.

During the Spanish-American war, in 1898, United States forces invaded Puerto Rico and began a relationship between the island and the emerging super power which to date defines the political, social, and economic structure of Puerto Rico. A relationship that was sustained, in great part, at least in the first half of this century, by Puerto Rico's geographic strategic value. Prior to the arrival of the U.S. forces, the Spanish had already established various geographic functions and organizations, including various types of laws (urban, forest and environmental) and geographical societies.

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During the 20th century, the North Americans conducted additional geographical studies of the island. Berkely (1915), Megerhoff (1933), and Mitchell (1954) conducted significant studies of the geology. However, the most extensive research on the natural condition of Puerto Rico was the *Scientific Survey of Puerto Rico* (New York Academy of Science, 1920). More recently, Watson Monroe (1980, 1976), Berryhill (1960, 1965), and Mattson (1957) conducted geological research in Puerto Rico.

Most of the geographical research of the first half of the 20th century was dominated by North American institutions. It was not until the appearance of Rafael Picó, that local geographers participated in the development of geographical knowledge. Picó was the first president of the Planning Board (local government agency in charge of public planning policy). His book entitled *La Nueva Geografía de Puerto Rico (The New Geography of Puerto Rico)* (Picó, 1975) established contemporary geographical thinking in Puerto Rico.

The first and only Department of Geography was founded at the University of Puerto Rico, San Juan Campus in 1968, thanks in great part to the efforts of professor Pedro Parrilla and several other professors from other countries. Since then, most of Puerto Rico geographical knowledge has emerged from that University unit. The Department has studied and integrated ideas from a variety of schools of thinking, such as quantitative revolution, radical geography, environmental determinism and possibilism, and regional and systemic approaches.

The Department of Geography at the University of Puerto Rico is still the only one in the entire island. It is considered unique in terms of its curriculum, publications, and activities. There are six full-time professors and several other on part-time basis at the Department. Professor José F. Cadilla specializes in physical geography, Angel D. Cruz in cartography and geographical information systems, Carlos Guilbe in planning and urban geography, Francisco Watlington in biogeography and anthropogeography, Carlos Severino in political and regional geography, and myself in human ecology and geographical information systems. In terms of regional areas of interest, Guilbe concentrates on North America, Cruz and Cadilla on Puerto Rico, Watlington on the Caribbean, Severino on Europe, and I on Africa, Latin America, and the Caribbean.

## PHYSICAL GEOGRAPHY

Research production on this subject has been very extensive, particularly the work done by federal and local government agencies. In geology and geomorphology, the United States Geological Survey (USGS) prepared the topography and geologic quadrangles of the island of Puerto Rico. It also promotes research in marine geology, water research and hydrogeology of Puerto Rico. The list of publications on this area of study is extensive.

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Two geographers that have distinguished themselves in geology and related fields are José F. Cadilla and José Molinelli. Cadilla's work (1958, 1977) covers the mineral resources of Puerto Rico, karst topography and hydrogeology. Molinelli is currently the Director of the Environmental Science Program at the University of Puerto Rico, San Juan Campus. His research has been in erosion and sedimentation problems, earthquake mitigation, and Caribbean plate tectonics.

In the field of soil science, the most distinguished contribution to geographic knowledge is the *Inventory and Classification of Soils for all Puerto Rico's regions*. This publication prepared by the Soil Conservation Agency is a valuable aerophotographic source of information on soils' natural and physical properties (Soil Conservation, 1975).

In another area, the National Meteorological Weather Service is responsible for collecting all the climatological and meteorological data. Another area of great importance to Puerto Rico is Coastal Zone Management. In this regard, the Department of Natural Resources published a compendium of Puerto Rico's Coastal Zone (1975). In terms of expanding geological knowledge, the most extensive work is that of Kaye (1959). My doctoral thesis (1983) and William's (1965) research address the geomorphic changes of Puerto Rico's north coast.

## HUMAN GEOGRAPHY

There has been extensive development in human geography during the last 10 years. The many books and articles published reflect a wide diversity of approaches and methods used in this discipline. However, in general, systemic and regional works prevail. As an example, the book published by Cadilla and Cruz (1988) entitled *Pueblos de Puerto Rico (Towns of Puerto Rico)* provides data about the municipal geography of Puerto Rico. On the other hand, *Geovisión de Puerto Rico* (Galiñanez, 1977) presents the systemic components such as geology, climatology and population of Puerto Rico. My most recent book in this field is *Geografía, Ecología y Derecho de Puerto Rico y el Caribe (Geography, Ecology and Law of Puerto Rico and the Caribbean)* (1994).

The contribution of Puertorican geographers to human geography is extensive. In economic geography and planning, professors Pedro Parrilla and Carlos Guilbe have been working in the areas of agrobusiness and urban development, respectively. Dr. Angel Cruz published his work on agricultural geography of the sugar cane industry (Cruz, 1977). Currently, professor Vicky Muñoz is working on her project for geographical analysis of the profile of Puertorican women in New York. Professor Eneida Rivera is preparing a dissertation regarding the impact of geographical factors on employment in Puerto Rico, 1950-1990.

Two professors that recently finished their doctoral studies are Francisco Watlington, who is involved in studies related to viticulture adaptation in Puerto

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Rico and the Caribbean, and Enrique López, who completed an urban economic analysis of the Fajardo municipality. In the field of political geography, professors Carlos Severino and Julio Muriente are major protagonists. Both have interest in Caribbean geopolitical processes. Severino, the current Chairman of the Geography Department, is also interested in the European geopolitical situation. In human ecology, professor Nancy Villanueva has completed a study, from the human geography perspective, on solid waste disposal.

During the last two decades, Puerto Rico has experienced extensive urban development. Several geographers have made a commitment to work intensively in the field of urban geography. Professors Guilbe, Severino, Corrada, Salicrup, and Seguinot have worked in this area to some extent. Severino produced a study of San Juan's regional standing in the territorial economy of Puerto Rico. I have published several articles on San Juan urban ecology and geographical history. Professor Ramón S. Corrada (1994) recently finished his doctoral dissertation on the historical-geographical development of Santurce, the commercial center of the San Juan area, from 1582 to 1930. During this period, San Juan attained primacy within the urban system of Puerto Rico and Santurce became the main focus of development, establishing the urbanization pattern that influences development to this date.

In the field of medical geography, two geographers have done their doctoral dissertation about Puerto Rico. Professor Sonia Arbona did a study on environment and pathogen distribution in Puerto Rico and professor Victor Santiago conducted similar type of research, but went further by considering socio-economic conditions of the affected population.

## CONCLUSION

Geography in Puerto Rico has evolved from a descriptive into a nomothetic, experimental and analytical science. The influence of international intellectual currents has affected our discipline, making it an eclectic one, but always preserving the basic principles of integration and interrelation. The work done to date represents several paradigms and traditions including the general theory of systems, regional and systematic geography, radical geography, ecological approach, quantitative methods, and cybernetic orientation. Geography in Puerto Rico is a strong discipline complemented with field work and geographical techniques, such as cartography, geographical information systems and remote sensing.

It is quite evident that there is a distinctively Puertorican school of geographic thinking which, nevertheless, has been influenced by that from other countries. Among the best known geographers in Puerto Rico, from outside the island, are : Jim Blau and David Harvey from United States; Joaquin Bosque Maurel and Vilá Valenti from Spain; Milton Santos and Robert Moraes from Brazil; Levi Marrero from Cuba; Gilles Ritchot and Guy Mercier from Québec, Canada.

Collaboration with these and other sources of geographic knowledge continues to be expanded. For example, a joint project between the University of Puerto Rico and Laval University in Québec has been formalized, for the development of a treatise entitled *Prohibited Globalization in Quebec, Caribbean, and America*. This is but the first of several such projects now under consideration for the near future.

It is recognized that the many international influences have come together with local and Caribbean geographical elements to produce a very complex and diverse geographical base of knowledge in Puerto Rico.

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