

TOPOGRAPHICAL SURVEYS IN HISPANIC AMERICA.

(*Extract from Notes on a New Map showing the extent and character of Surveys in Hispanic America, by RAYE R. PLATT, published in the Geographical Review, New-York, January 1930, page 138.*)

By means of the source material collated for the American Geographical Society's Millionth Map of Hispanic America, the author has constructed a "reliability map" showing the extent and character of existing surveys for the whole of Hispanic America.

In this article the author passes under review the cartographic history of the mapping of Hispanic America which has covered two distinct periods and is now well advanced in a third period.

In the first period — from the Discovery up to the early years of the nineteenth century — the broad outlines of the continent gradually took form as notes and sketches; and, finally, fairly accurate surveys tied to astronomically located positions accumulated and were compiled into maps of steadily increasing range, detail and accuracy. Little in the way of original surveys by navigators and cartographers has come down to us from this period. Our knowledge of the work done comes to us mainly from the remarkable compiled maps and atlases of the period.

The second period may be termed the period of reconnaissance surveys, because it is chiefly characterised by the explorations of European scientists and travellers who, while only in exceptional cases employing precise methods of survey, produced thousands of miles of route and river traverse, the greater part of which has never been replaced by later or more accurate surveys. These explorers of the second period have left behind them maps that are lasting monuments to their devotion and skill: CODAZZI's maps of Venezuela and Colombia, PISSIS' map of Chile, RAIMONDI's map of Peru, and WOLF's map of Ecuador are outstanding examples. No article on the cartography of Hispanic America is complete without reference to these men.

The third period may be termed the period of national economic development.

The entrance of the third period, however, by no means closed the period of reconnaissance surveys for purely scientific purposes. Such surveys are still in progress and differ from earlier surveys of the sort only in that they are in general carried out by more precise methods. But in quality and extent they are now quite outweighed by surveys conducted for the exploitation of the natural resources of the various countries, surveys for transportation and communication routes, surveys for the location and demarcation of international boundaries.

The programmes of topographic survey now instituted in many of the countries have for their purpose the systematic examination of natural resources: but progress on them is slow and also, a chief source of new and accurate surveys of extensive areas is found in the surveys that have been made, particularly during the last fifteen years, by development companies.

For the compilation of his "reliability map" the author has classified the original surveys in five groups:—

1. Triangulation with precise topographic survey;
2. Triangulation with approximate topography from plane-table sketches and traverses;
3. Reliable traverses;
4. Approximate traverses and compass stretches;
5. Triangulation without other surveys;

appearing on the map in different colours. Unsurveyed areas have been left blank.

The first group consists mainly of the work so far completed on the programmes of systematic topographic survey on which certain of the Hispanic American governments are now engaged — for instance, the surveys conducted by the Instituto Geografico Militar of the Argentine Army; the sheets of the Carta Nacional of Peru on the scale of 1:200,000; the Military Maps on a scale of 1:25,000 of the Argentine Republic, of Chile and of Colombia; the map on the scale of 1:200,000 of the Argentine Direccion de Minas, Geologia e Hidrologia and of the Servicio Geografico of the Peruvian Army; and the map on the scale of 1:100,000 by the Geological Survey of the Brazilian State of Sao Paulo. To this have been added in Columbia certain sur-

veys made for the examination and exploitation of mineral and petroleum areas. In Peru there have been added, in the vicinity of Lima, a number of irrigation surveys.

The second group includes topographic reconnaissances by various approximate methods based on good triangulation. Although only in rare instances do these surveys include contouring of any sort, they do include a sufficiently large number of spot heights to make it possible to construct contours that on the scale of 1:1,000,000 closely approach the results of an actual contoured survey. The most extensive area covered by surveys of this type is the Chile-Argentine boundary zone, of which the best available surveys are those made by the Chilean Boundary Commissions. There triangulation in its precise sense was not employed, but a system of polygons was substituted for it. (1)

The third group includes reconnaissances and traverses made with great variety of methods but in all cases based on stadia, theodolite, or plane-table traverses tied in most cases to accurately determined astronomical positions. In it are included railway and road traverses, the more precise railway and road reconnaissances, and route and river traverses as well as plane-table and theodolite reconnaissances of mining and petroleum areas; for instance, a large part of the area of Mexico is made up of surveys of this type.

The fourth group is made up of the less reliable route sketches.

The fifth group consists of precise triangulation made for geodetic measurements and unaccompanied by topographic surveys. The most famous of these is the Measure of the Arc of the Meridian of Quito conducted from 1899 to 1906 by a mission of the Service Géographique of the French Army under the auspices of the French Academy of Sciences.

These original surveys of Hispanic America are, however, widely scattered. They are to be found to some extent in scientific periodicals and books. In sheet-map and atlas form they exist in many widely scattered collections. A great part of them, however, are to be found only in the confidential archives of the various Hispanic American governments and of foreign and domestic development companies. For the published maps, widely scattered as they are through numerous libraries and collections, a general catalogue is needed if they are to be generally accessible to students of Hispanic America. In order that the unpublished and in large part confidential surveys may be made accessible, it is necessary that they be compiled into a general map on a sufficiently large scale for actual use. The latter need will be supplied by the Society's Millionth Map of Hispanic America. For the former the Society has now completed the compilation of the catalogue of maps of Hispanic America on which it has been working for the past seven years.

The catalogue has been compiled from the published maps contained in the library of the American Geographical Society, the New York Public Library, the Library of Congress, the library of the Pan American Union, and the libraries of Harvard, Yale, and Columbia universities. The catalogue is a selected and classified list of over 15,000 items. It will be published by countries in four volumes, the map list for each country being divided into five sections: (I) Maps in Scientific Periodicals; (II) Maps in Books; (III) Sheet and Atlas Maps (Official Publications); (IV) Sheet and Atlas Maps (Unofficial Publications); (V) Historical Maps. Articles on the cartography of the various countries with reliability diagrammes on a rather large scale will accompany the map lists. The catalogue is now being set in page proof, and it is expected that it will be ready for distribution in the spring.



(1) See Prof. A. Bertrand: *Methods of Survey employed by the Chilean Boundary Commissions in the Cordillera of the Andes*, Geogr. Journ. Vol. 16, 1900, pp. 329-345