

Grids & Datums

REPUBLIC OF PANAMÁ

by Clifford J. Mugnier, C.P., C.M.S.

Explored by Christopher Columbus in 1502, Panamá was occupied by various American Indian groups including the peaceful San Blas fishermen and the headhunter warriors of Darién. The Spanish explorer Vasco Nuñez de Balboa established the first successful colony at Darién in 1510, and Balboa was the first European to discover the Pacific Ocean in 1513. (The Panamanian unit of currency is the Balboa.) The City of Panamá was originally founded in 1519, but was later rebuilt a few miles to the west after the British pirate Henry Morgan sacked and burned it in 1671. I used to live on a cove in the Bay of Panamá where I could see the ruins of Old Panamá City from the front yard of my parents' home. The Isthmus of Panamá has been a major center of commerce and trade since its discovery because it provides the shortest land bridge between the Caribbean Sea and the Pacific Ocean. When the French Geodesists traveled to Quito (*PE&RS*, May 1999), to measure the size and shape of the Earth in the 17th century, they packed their scientific instruments onto mules to traverse the Isthmus of Panamá. The French originally attempted to dig a canal across

bean Sea to the north and by the Pacific Ocean to the south. Panamá is slightly smaller than South Carolina, its lowest point is the Pacific Ocean (0 m), and the highest point is Volcán de Chiriquí (3,475 m). The soils of Chiriquí Province are volcanic in origin, and the range-fed cattle on the local grasses there develop a distinctive flavor to their flesh. My late Uncle Gus (Johnny Gustin), owned the only gourmet restaurant (*Restaurante Sky Chef*), in Panamá City in the 1950s; one item on his menu was a Chiriquí Porterhouse steak. Although tough as shoe leather, they were sensationally popular for their unique taste!

The oldest known datum for the republic is the Panamá-Colón Datum of 1911 where the origin is at Balboa Hill: $\Phi_o = 09^\circ 04' 57.637''$ N, $\Lambda_o = -79^\circ 43' 50.313''$ West of Greenwich and the azimuth (likely from south), to station Salud is: $\alpha_o = 185^\circ 02' 39.54''$. The ellipsoid of reference is the Clarke 1866 where: $a = 6,378,206.4$ m, and $b = 6,356,583.8$ m (Hugh C. Mitchell, *Definitions of Terms used in Geodetic and Other Surveys*, U.S. Coast & Geodetic Survey, Special Publication No. 242, 1948). The U.S. Army Corps of Engineers es-

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the isthmus in the 19th century, but failed to conquer the female *Anopheles* mosquito, the carrier of Malaria. After the United States purchased the rights from the French, the Americans conquered both the *Anopheles* (through the efforts of Dr. Gorgas of the U.S. Army), and the Cucaracha rock (an awful gooey glop when wet and nearly rock-hard when dry), of the Culebra Cut. The Panamá Canal was completed in 1914 after the country achieved independence from Colombia (*PE&RS*, November 1997), and the Canal Zone concession was granted to the U.S. The U.S. Canal Zone was later ceded back to Panamá by a 1977 treaty and then invaded in 1989 to capture General Manuel Noriega who continues to enjoy the hospitality of the U.S. Federal Prison Service. During that invasion, U.S. Navy SEALs engaged in a battle at the then new Paitia Airfield – an area that had been used for anti-aircraft emplacements during WWII, later abandoned and then used by my boyhood cronies and I when we stalked & hunted each other in the tall grass with *Red Ryder*® BB rifles!

Panamá is bordered on the west by Costa Rica (330 km), and on the East by Colombia (225 km); its coastline is 2,490 km by the Carib-

established this datum during surveys that were performed between 1904 and 1935. The map projection associated with that old datum is the Panamá Polyconic (American Polyconic math model) where the Latitude at Origin, $\phi_o = 08^\circ 15'$ N, the Central Meridian, $\lambda_o = -81^\circ$ W, the Scale Factor at Origin, $m_o = 1.0$, the False Easting = 1,000,000 yards and the False Northing = 1,092,972.10 yards. This polyconic is probably associated with the pre-WWII artillery grid system known as the World Polyconic Grid, and after that war the Inter-American Geodetic Survey (IAGS) of the U.S. Army Map Service started entering into cooperative agreements with all of the countries of Latin America. Through these agreements, the IAGS carried the North American Datum of 1927 through the West Indies and Central America into Panamá. The origin of the NAD27 is at triangulation station Meades Ranch, Kansas where: $\Phi_o = 39^\circ 13' 26.686''$ N, $\Lambda_o = -98^\circ 32' 30.506''$ West of Greenwich and the azimuth (from south), to station Waldo is: $\alpha_o = 75^\circ 28' 09.64''$. Of course, the ellipsoid of reference is the Clarke 1866. As was the custom of the IAGS for nations in Central America,

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the Lambert Conformal Conic was employed as the local grid system or each country in one or two zones. For the Republic of Panamá, a single zone was developed since there is little north-south extent in the predominately east-west country. The Panamá Lambert Conformal Conic grid system is defined where the Latitude at Origin, $\phi_o = 08^\circ 25' N$, the Central Meridian, $\lambda_o = -80^\circ W$, the Scale Factor at Origin, $m_o = 0.99989909$, the False Easting = 500 km and the False Northing = 294,865.303 meters. Reports of the existence of an Ancon and a Balboa datum are likely erroneous, considering that the origin of the Panamá-Colón Datum of 1911 is at Balboa Hill, and the access road up the hill is from the town of Ancon, Canal Zone where Ancon Hill is pretty small in comparison.

In 1946 aerial photography began to be used for Panamanian mapping; a 1:20,000 scale map of the Canal Zone was made by the Army Map Service (PAIGH, *Centro* 1952, p. 419; UN 1979, p.193). The Sección de Cartografía was established in the same year; it would eventually be renamed the Instituto Geográfico Nacional "Tommy Guardia" (UN 1979, p. 21; *Twenty* 1966, p. 108). As late as 1949 there were features that did not appear on then current maps, such as a range of mountains 120 miles long and over 5,200 feet high only sixty miles from the Canal Zone (Conly 1956, p. 338; *Cartography in the Americas*, 1951. p. 53). In 1954, the Sección became the Oficina de Cartografía, and in 1955, it was renamed the Dirección de Cartografía (*Twenty* 1966, p. 108). Between 1958 and 1960 the U.S. Army Map Service began a 1:25,000 scale map series, which was less than 25% complete in 1963 (Birch 1964, p. 11). By 1964, the AMS series at 1:50,000 scale covered the south coast, the peninsula west of Panamá City, and islands in the Gulf of Panamá. In 1962, the Dirección began work on a 1:10,000 scale map series.

One of the major reasons for such sparse and patchy cartographic coverage in such a relatively small country was the almost continuous cloud cover, which for twenty years precluded obtaining satisfactory aerial photography. As the same time the vegetation, fauna, and physiography militated against the use of planetable mapping. Up to 1965, about 47 1:50,000 scale sheets had been issued. In 1967, side looking airborne radar (SLAR) cut through the clouds and provided imagery that could be used in the compilation of 1:250,000 scale sheets covering 55% of the country that included the Darién Province. By late 1968, all 12 of the 1:250,000 scale sheets, 109 of the 199 1:50,000 scale sheets and 47 of the 700 1:25,000 scale sheets had been completed.

In the late 1950s I used to go to Sidney Townsend's house in Balboa for Friday night Bee-Bop dances while I was a student at Balboa High School. Sidney's father was a Panama Canal Company Land Surveyor, and he usually stayed upstairs while the high school kids danced downstairs. One evening, I walked up the stairs and listened to a surveying story related by Mr. Townsend. As I recall, he said that he went on a surveying expedition in the 1930s or early 1940s into Darién Province. He took along a large contingent of helpers that was comprised mainly of local Panamanian laborers. One of the men was a fellow with a distinctively shaped scar on one cheek of his face. He remembered him because the fellow disappeared one night and Mr. Townsend assumed that the fellow got tired of the hard work and just walked back to the city. Years passed by, and Mr. Townsend said that one afternoon after WWII, he was walking along Avenida Central, the main shopping street in downtown Panamá City, and he noticed

one glass display case that had a number of shrunken heads. One head startled him as he recognized the scar on one cheek of the face! Mr. Townsend told me he purchased the head from the shopkeeper and he took it to the late fellow's Parish Priest for a proper Catholic burial. I suspect that Mr. Townsend might have been associated with the monumentation and survey of the 14 boundary markers for the Panamá-Colombia Boundary Treaty signed on 17 June, 1938 (*International Boundary Study No. 62 - January 30, 1966*, The Geographer, Bureau of Intelligence and Research, U.S. Dept. of State).



The contents of this column reflect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the American Society for Photogrammetry and Remote Sensing and/or the Louisiana State University Center for Geoinformatics (C⁴G).

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