

mercury in the barometer, the waters of the Apure have only a fall of thirty-four toises from San Fernando to the sea. The fall from the mouths of the Osage and the Missouri to the bar of the Mississippi is not more considerable. The savannahs of Lower Louisiana everywhere remind us of the savannahs of the Lower Orinoco.

During our stay of three days in the little town of San Fernando, we lodged with the Capuchin missionary, who lived much at his ease. We were recommended to him by the bishop of Caracas, and he showed us the most obliging attention. He consulted me on the works that had been undertaken to prevent the flood from undermining the shore on which the town was built. The flowing of the Portuguesa into the Apure gives the latter an impulse towards south-east; and, instead of procuring a freer course for the river, attempts were made to confine it by dykes and piers. It was easy to predict that these would be rapidly destroyed by the swell of the waters, the shore having been weakened by taking away the earth from behind the dyke to employ it in these hydraulic constructions.

San Fernando is celebrated for the excessive heat which prevails there the greater part of the year; and before I begin the recital of our long navigation on the rivers, I shall relate some facts calculated to throw light on the meteorology of the tropics. We went, provided with thermometers, to the flat shores covered with white sand which border the river Apure. At two in the afternoon I found the sand, wherever it was exposed to the sun, at  $52.5^{\circ}$ . The instrument, raised eighteen inches above the sand, marked  $42.8^{\circ}$ , and at six feet high  $38.7^{\circ}$ . The temperature of the air under the shade of a ceiba was  $36.2^{\circ}$ . These observations were made during a dead calm. As soon as the wind began to blow, the temperature of the air rose  $3^{\circ}$  higher, yet we were not enveloped by a *wind of sand*, but the strata of air had been in contact with a soil more strongly heated, or through which whirlwinds of sand had passed. This western part of the Llanos is the hottest, because it receives air that has already crossed the rest of the barren steppe. The same difference has been observed between the eastern and western parts of the deserts of Africa, where the trade-winds blow.