

with the ocean, and a refraction equal to 0·079 of distance. It has been doubted whether the peak has ever been seen from the channel which separates Lancerota from Forteventura, and which is distant from the volcano, according to the chart of Varela,  $2^{\circ} 29'$ , or nearly 50 leagues. This phenomenon appears nevertheless to have been verified by several officers of the Spanish navy. I had in my hand, on board the Pizarro, a journal, in which it was noted, that the peak of Teneriffe had been seen at 135 miles distance, near the southern cape of Lancerota, called Pichiguera. Its summit was discovered under an angle considerable enough to lead the observer, Don Manuel Baruti, to conclude that the volcano might have been visible at nine miles farther. It was in September, towards evening, and in very damp weather. Reckoning fifteen feet for the elevation of the eye, I find, that to render an account of this phenomenon, we must suppose a refraction equal to 0·158 of the arch, which is not very extraordinary for the temperate zone. According to the observations of General Roy, the refractions vary in England from one-twentieth to one-third; and if it be true that they reach these extreme limits on the coast of Africa, (which I much doubt,) the peak, in certain circumstances, may be seen on the deck of a vessel as far off as 61 leagues.

Navigators who have much frequented these latitudes, and who can reflect on the physical causes of the phenomena, are surprised that the peaks of Teyde and of the Azores\* are sometimes visible at a very great distance, though at other times they are not seen when the distance is much less, and the sky appears serene and the horizon free from fogs. These circumstances are the more worthy

\* The height of this peak of the Azores, according to Fleurieu, is 1,100 toises; to Ferrer, 1,238 toises; and to Tofino, 1,260 toises: but these measures are only approximative estimates. The captain of the Pizarro, Don Manuel Cagigal, proved to me, by his journal, that he observed the peak of the Azores at the distance of 37 leagues, when he was sure of his latitude within two minutes. The volcano was seen at  $4^{\circ}$  S. E., so that the error in longitude must have an almost imperceptible influence in the estimation of the distance. Nevertheless, the angle which the peak of the Azores subtended was so great, that the captain of the Pizarro was of opinion this volcano must be visible at more than 40 or 42 leagues. The distance of 37 leagues supposes an elevation of 1,431 toises.