

NAVIGATION IN CABRILLO'S TIME

By Jerry MacMullen

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Considering the ^{many} thousands of words which have been written about the romance of Cabrillo's voyage, it is regrettable that no one has bothered to set down any of the details of the methods ^{which} he used to tell -- more or less -- where he was going, where he had been, and how to get back to his original base.

It would seem that both João Rodrigues Cabrilho (if we wish to use his correct ^{Portuguese} name) and his pilot, Bartolomé Ferrel, were acceptable navigators according to the standards of their time. The fact that his recorded latitude for San Diego was $1^{\circ} 40'$ in error ¹ is no great reflection upon his skill, considering the equipment with which he had to work. The story that his longitude was so badly off that when he sighted Santa Catalina Island he thought he had reached the coast of China, probably is a bit far-fetched, ^{although} errors of any kind, in those days, were possible -- as witness the attempt, the year before Cabrillo reached San Diego, to determine ~~the longitude~~ the longitude of Mexico City. There the best minds and the best available instruments combined to produce a result which was off by some 1450 miles. ² ~~The astronomers,~~ of course, ~~know that~~ longitude, in those days, was little more than an educated guess, ~~longitude being a function of time,~~ ^{as} its determination is dependent upon ~~determining accurately~~ ^{knowing accurately} your own local time; ~~and~~ that, of course, means having a highly ^{dependable} ~~accurate~~ timepiece aboard.

"Well, then," you may ask, "Why didn't they carry clocks on board those early ships?" The answer is that in those days, clocks depended upon pendulums to govern their "escapement", ~~and~~ ^{and compensation for changes of temperature was unknown.} You may well imagine what would happen to a swinging pendulum on a rolling, pitching ship. ~~It was not~~ It was not until Harrison's invention of the chronometer in the Eighteenth century that ~~anything approaching~~ accurate time-keeping at sea was possible.

