

Navigating through History: Development of Units of Length in Nautical Charts Depicting the Adriatic Sea, ca. 1270–1824

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Abstract:

The Mediterranean Sea is a crucible where diverse cultures, geopolitical strategies, and economic interests converge, highlighting its significance for interdisciplinary studies. The Adriatic Sea, a crucial part of this region, shares similar developmental challenges with the wider Mediterranean area, particularly in the context of maritime navigation—a practice deeply rooted in the basin for millennia. This research aims to scrutinize the map scales and units of measurement employed on nautical charts of the Adriatic Sea, spanning from approximately 1270 to 1824, to assess their effectiveness in conveying essential navigational information.

This study meticulously reviews a corpus of 84 nautical charts of the Adriatic and the Mediterranean Sea, employing a systematic and thorough methodology to document all identified scales and corresponding units of length. These findings were cataloged in tabular form to facilitate comparative analysis. Employing chronological ordering, the historical development and quantitative application of these measurement units on the charts were traced, enabling the visualization of their historical development over time in both qualitative and quantitative terms.

An extensive literature review supported the identification of specific units of length depicted on individual charts. By analyzing the units of length, considering information about the quantity of measurement units within one degree of the great circle, it was assessed whether cartographers accurately linked specific scales to corresponding units. A detailed review of the scales and measurement units on the charts provided a comprehensive overview by number and type of length units for each analyzed chart. Charts that lacked explicitly stated measurement units but included a linear scale were assumed, based on the literature, to relate to the *portolan mile*. The scale on the charts could be used in various ways. Namely, during the late Middle Ages and early Modern Period, a linear scale could be converted into a numerical scale, calculated using the length values of a degree if a graticule was present on the chart, and compared with another map of the same area but different scale. It could also be used with a caliper to determine the distance between points. To do this, it was necessary to know the length of a specific unit and which length of a unit the cartographer had in mind, as cartographers often incorrectly named certain units. The lengths of units changed during time; for instance, Cardarelli (1997) asserts that the length of the *lieue de Paris* was equivalent to 1,666 *toises* or 3,247 m in 1674, in the period from 1674 to 1737 its length was 2,000 *toises* or 3,898 m, and in the period from 1737 to 1794 its length spanned to 2,280 *toises* or 4,444 m. Similar changes happened with other studied units of length.

During the early Modern Period, cartographers used a significant variety of units of length on linear scales. On manuscript charts, cartographers generally did not assign a measurement unit to the linear scale. The most commonly used units of length, on early Modern Period charts, were the Italian, German, and Dutch miles, and the Spanish, French, and English leagues (Figure 1). The geographical specificities of those units were also considered, indicating the international usability of the charts. Based on the studied corpus, it can be concluded that cartographers had problems with the terminological definition of "mile" and "league," often using these concepts interchangeably. Problems with the terminology of measurement units and equating miles and leagues as synonyms are examples of how semantic confusion can affect the interpretation and use of cartographic information. This issue could have also had practical consequences for maritime navigation. The results of this research are expected to enrich the existing knowledge on the history of map scales and the units of length used on them.

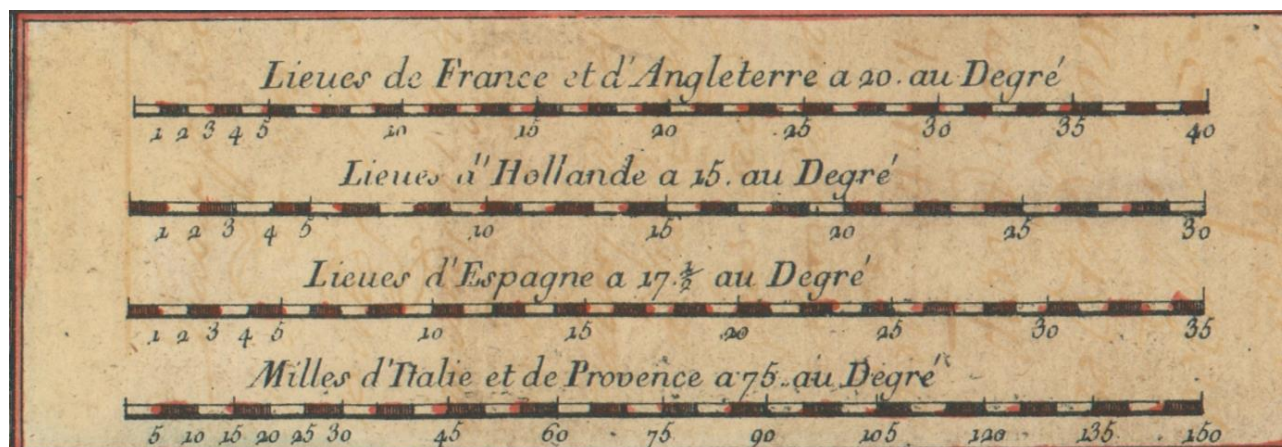


Figure 1. Map scales and units of length found on J. Roux (1764) chart (National and University Library in Zagreb).

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