

The soundings which could be ascertained with the appliances then in existence were noted in the charts, but only on some points of important coasts. The oldest bathymetrical charts of the North Sea, the English Channel, and the British coasts, show such soundings at points near the coasts, for instance, in the chart of G. Mercator, representing the "Hollandt Comitatus" (completed in 1585), and in the charts of Lucas Janszoon, Waghenaer of Enkhuyzen (1586) who, by his *Spiegel der Seevaerdt*, became the founder of nautical map collections.<sup>1</sup> These authors were imitated by William Blaeu and Jan Janszoon.

As the soundings multiplied, it became more difficult to place them on marine charts without detriment to their clearness. It was then sought to represent them by a method, the first application of which to charts is due to Philippe Buache. This geographer, whose ideas on the classification of the oceans have already been mentioned, was led by his researches to study the bottom of the sea, and he endeavoured to find the means of representing its inequalities. With this view he introduced curves of equal level, and, from what has been stated of his views, it will be seen that he was indeed a man to whose mind this improvement would naturally suggest itself. This important innovation in the tracing of charts, now even more generally employed in the representation of land surfaces, was applied to the sea for the first time in a chart of the English Channel drawn by Buache in 1737, in which he traced, according to soundings made every ten fathoms, isobathic curves, or curves of equal level.<sup>2</sup>

USE OF ISOBATHIC  
CONTOUR LINES  
ON CHARTS.

The bathymetrical indications shown on certain marine charts of the time, and the labours of Buache just referred to, lead us to speak of the knowledge possessed during the seventeenth century as to the depths of the sea. The requirements of navigation undoubtedly led to the earliest bathymetrical observations, at first confined to the vicinity of the shores and comparatively shallow waters. But when the scientific movement began in earnest, there were minds prepared to investigate everything regarding the sea, knowing that, in order to have an accurate notion of the form of our planet, it is important not only to measure the elevation of the surface above water, but also to sound the hidden depths of the ocean. Notwithstanding, very little progress was made in the bathymetry of the sea, on account of the difficulties which beset such investigations. If in our day, when so many able instrument-makers have taxed their ingenuity to devise new appliances for deep soundings, there still remain many improvements to be made before accuracy is secured, it is not astonishing that the first attempts proved unsuc-

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<sup>1</sup> In 1588 a reproduction of this atlas appeared in London as the first "waggoner."

<sup>2</sup> According to Licka (*Zur Geschichte der Isohypsen, Zeitschr. f. Vermessungswesen*, Bd. ix. p. 40), the French engineer Millet de Mureau was the first, in 1748, to place on plans of forts numbers indicating the altitude near each point levelled. He did not, however, succeed as yet in uniting points of equal altitude by a contour line, an idea which the Dutchman Cruquius had put in practice twenty years before when sounding the river Merwede. Buache, as we have said in the text, is nevertheless considered as the first to make use of isobaths for the sea (see Günther, *Lehrbuch der Geophysik*, Bd. i. p. 289, Stuttgart, 1884).