

Early soundings.

Cusanus' bathometer.

Puehler's apparatus.

Alberti's apparatus.

Hooke's apparatus.

From time immemorial soundings were taken by hand with a plummet, always in shallow water near land, but attempts have not been wanting to sound the ocean without the aid of a line. Thus about the middle of the fifteenth century Cardinal Nicolaus Cusanus invented a bathometer, consisting of a hollow sphere with a heavy weight attached by means of a hook; on touching the bottom the weight was detached, and the sphere returned to the surface, the interval of time from the launching of the apparatus to the re-appearance of the sphere at the surface indicating the depth. A century later Puehler improved on Cusanus' bathometer by adding a piece of apparatus (clepsydra) to measure the time from the disappearance to the re-appearance of the float, using for this purpose a clay vase with a small orifice at the bottom, through which water was made to enter during the period of the experiment, the amount of water in the vase indicating the depth. Alberti subsequently replaced the sphere by a light, bent metal tube. In 1667 Robert Hooke described in the *Philosophical Transactions* a similar apparatus, shown in the tailpiece to Chapter IV., with which experiments were made in the Indian Ocean, but there was always doubt as to the moment when the float returned to the surface, and to remedy this Hooke introduced first a clockwork odometer to register the descent, and then two odometers—one for the descent and the other for the ascent. These various forms of bathometers, though interesting historically, proved of little practical value.

First soundings laid down on maps.

Soundings in shallow water first appeared on a map by Juan de la Cosa in 1504, and soundings were laid down on maps by Gerard Mercator in 1585 and by Lucas Janszon Waghenaer in 1586.

First attempt at deep-sea sounding.

Magellan.

Probably the first attempt at oceanographical research to which the term "scientific" may be applied is Magellan's unsuccessful effort to determine the depth of the Pacific Ocean during the first circumnavigation of the globe. In 1521, we are told, Magellan tried to sound the ocean between the two coral islands, St. Paul and Los Tiburones in the Low Archipelago, making use of the sounding lines carried by explorers at that period, which were only 100 to 200 fathoms in length. He failed to touch bottom, and therefore concluded that he had reached the deepest part of the ocean. This first authentic attempt at deep-sea sounding ever made in the open sea is historically extremely interesting, though scientifically the result was negative.