

the extension of the sea around the known world. They considered the Atlantic and Indian Oceans to be great enclosed seas like the Mediterranean; they held that the extreme points of the known land towards the east and the west approached so nearly to each other that a ship, parting from the west, might easily reach the eastern extremity, which they regarded as greatly extended. This error was perpetuated, thanks to the influence of Ptolemy, and led indirectly, fourteen centuries afterwards, to the discovery of the New World by Columbus.

C.—OCEANOGRAPHICAL VIEWS DURING THE DARK AGES, THE MIDDLE AGES,  
AND THE RENAISSANCE.

When the barbarians invaded and overran Europe during the fourth and fifth centuries, ancient society as well as the science and geographical knowledge of antiquity were swept away. The maps of Eratosthenes, of Marinus of Tyre, of Ptolemy were destroyed or buried for centuries beneath the ruins of ancient civilisation. The advanced views of the Greek philosophers concerning the figure of the earth, the motions of the heavenly bodies, and the distribution of land and water, were forgotten and were replaced by the crudest conceptions concerning natural things. It is not necessary to dwell on the errors which were current concerning the ocean during the centuries of decadence; a few examples will suffice to show how great was the retrogression from the advanced ideas of the Greek geographers.

In the sixth century Cosmas,<sup>1</sup> like most of his contemporaries, spurned the doctrine of antipodes; it is absurd, he said, for the earth is not a sphere but a quadrilateral plain, 400 journeys, or stations of 30 miles each, in length and 200 in breadth.<sup>2</sup> The degeneracy of geographical ideas is shown by the figures given in the work of Cosmas, who passed in his time for a great geographer.<sup>3</sup>

<sup>1</sup> Surnamed Indicopleustes—navigator of India. In early life he was an Egyptian merchant, and made several voyages to Indian ports; later he adopted a monastic life, and wrote his "Christian Topography."

<sup>2</sup> "Topographia Christiana" in Montfaucon, Coll. Nova Patrum, vol. ii. pp. 113 and 1706.

<sup>3</sup> Plate V. presents a rough plan of the earth as conceived by Cosmas. He thought, as we have said above, that the earth was oblong, twice as long as broad, and that the ocean surrounded the earth. Beyond the ocean was a second earth, reaching everywhere to the walls of heaven. On the eastern side of this transmarine earth he thinks that man was created, and there also the paradise of pleasure is situated. As this is described as being on the eastern shore, our first parents when driven out of Paradise betook themselves to the finite land situated on the shore of the sea. From thence Noah and his sons were carried in the ark, when the deluge occurred, to the land which we now inhabit. Four rivers of Paradise, arising in Paradise, he says, are conveyed by subterranean channels to this our land, and burst forth in certain places. He believes the Caspian to be a sea joined to the ocean, which, as we have shown elsewhere, was a view held by certain of the ancients. Plate V. also represents a conical mountain rising from the hinderpart of the earth; when this is reached by the sun, night is brought about for the inhabitants of the earth. There also the revolutions (periods) of the sun are indicated by lines whence arise the various seasons of the year. Thus, when the sun reaches the lowest line the nights are longer and the winter *τροπή* or period of the year takes place, the sun passes the greater part of his course behind the mountain; when the sun ascends to the middle line the equinox is caused, and the sun in travelling his course reaches the equinoctial line. Finally, when the sun reaches the uppermost line the summer period takes place and the sun arrives at the tropic. Cosmas denotes the revolutions (periods) of the sun by the words "winter night," "medium night," "summer night," as shown in the figure.

FOURTH AND  
FIFTH CENTURIES  
A.D.

SIXTH CENTURY  
A.D.  
COSMAS INDICO-  
PLEUSTES.