

FROM PORTOLANO CHARTS TO MODERN SEA GUIDES

By META P. HOWELL
LIBRARIAN OF THE MUSEUM

Charts and maps are the outcome of man's desire to give geographical expression to his knowledge concerning the nature and the distribution of the earth's surface features and to place them on record. It is from the Greeks that we have obtained our earliest knowledge of geographical maps, and it is a fact that all discovery and exploration led to map making. However, the origin of maps is clouded in as much obscurity as the in-

On these navigators' charts, the coast lines were carefully drawn and the ports inserted, on which account they are known as Portolano or Portolan Charts. The early pilots or mariners who constructed the charts gave the outline of the coasts, the position of harbors, and every kind of information that could be useful. The coast and geodetic survey maps now used as a basis in planning museum expeditions developed from these charts. Cosmographers of that day cared little for the scientific

tion useful to the mariner, and these Portolanos furnished the material for more general charts and maps of the world.

The charts of the Mediterranean and the Atlantic coasts form quite a distinct representation of geography. They antedate 1270 and are of surprising exactness, illustrating principally the Portolano or sailing directions in use among the seamen on the Mediterranean. Materials available even in the days of Ptolemy are embodied in them. The charts are based upon estimated bearings and distances between the principal ports or capes, the intervening coastlines being filled in from more detailed surveys. The bearings were dependent upon the seamen's observations of the heavens, for these charts were in use long before the compass had been introduced on board ship (as early as 1205, according to Ginot de Provins).

COLORFUL CREATIONS

The charts can be readily recognized by one of their most characteristic features: groups or systems of rhumb-lines (straight lines in the direction of different winds) radiating from a common center. The distances on the land or over the sea were laid down from certain fixed points and hence these maps are covered with a network of lines running in all directions from central points, called wind roses (Roses de Vente) or compass roses. These points of intersection were created with great artistry of color and beauty. The central group was generally encircled by eight or sixteen satellite groups. The predominating colors used in the construction of the charts were red, yellow, blue, green, black, gold, and silver.

Each chart was furnished with a scale of Portolano miles, whose length was 1,233 meters. Generally drawn on parchment or vellum, the charts have been preserved to us in two forms—either in single sheets produced in facsimile or in sheets bound together as an atlas. In the single-sheet chart, the size was determined by the size of the skin on which it was drawn, it being true in most cases that the entire skin was used, even the neck portion being retained, a fact that accounts for the peculiar and apparently unnecessary extension on the sheet, usually on the left.

More than 100 of these charts antedating 1500 are extant. The most important of these are the Portolanos of the early 14th century. The oldest of these maps is the Pisan Chart or Carte Pisane. This famous chart, the work of a Genoese artist, delineates the coast of the Mediterranean with surprising accuracy. Its first copy dates from 1300 (Pisa) and it was copied over and over again with some modifications until 1620. So good was the chart that it was used for actual navigation for more than three centuries.

MERCATOR'S CONTRIBUTION

The expansion of Portolano Charts into maps of the world resembles the wheel maps



EXAMPLE OF A PORTOLAN CHART PUBLISHED IN 1669
Australia and the East Indies, from Peter Goos's Sea Atlas, issued in Amsterdam.

vention of letters. Much can be written about the maps of antiquity. But in the important function of collecting specimens for the Museum from the sea, we are most interested in early sea charts, the forerunners of the modern coast and geodetic survey maps and the charts and sailing directions published today by the hydrographic offices of the various governments.

These early charts are known as the Portolano Charts. They were drawn in the first years of the modern age primarily for mariners engaged in coastwise sailing, but they likewise served as a guide for the bolder navigators in the beginnings of the oceanic stage of modern European expansion, when by sea, rather than by land, the unknown world was beginning to be penetrated. They are the first modern sailors' charts, the first of modern charts scientifically constructed and made by navigation.

labors of the Arabs. They did not, in constructing their nautical charts, avail themselves of the longitudes and latitudes collected by the Arabs or construct their maps upon any mathematical or scientific basis. What they laid down upon their maps was what had been obtained from actual observation. All information procured in this way was carefully collected and preserved, as is done today on the modern charts carried by museum staff members on their expeditions.

In preparing the Portolano Chart, the care of the cosmographer was to give as accurately as possible outlines of coasts, to indicate the promontories, the dangerous points, the shallow places, the reefs, the curvatures of gulfs and bays, and the sinuosities of the shore, and to fix the distance of one position from another with some exactitude. In addition to this, the Portolano was annotated with other informa-

of the earlier period. Gratiotus Benincasa was one of the most noted of Portolano chart or map makers, his works dating from A.D. 1435 to 1482. The Portolano charts were followed by many famous maps, such as the celebrated Catalan map of the world executed in 1375. This map is on parchment, beautifully colored and mounted to fold like a screen. It was extensively copied and reproduced in all the maritime cities of the Mediterranean for the use of mariners, and for a long time it was the map in use for all practical purposes.

Among other outstanding maps are the Juan de la Cosa map of 1500 and the Ribaro map. These maps could be called charts rather than maps, as their emphasis is more on the sea than on the land. Mercator's World Map of 1569 is famous as the first map on Mercator's projection. When the fullness of its details is considered in connection with the new and scientific method upon which he projected it, Mercator is entitled to the appellation of "Father of Modern Cartography."

The maps were then followed by a revival of Ptolemy's work after Jacobus Angelus de Scarparia had translated it into Latin in 1410. His version was printed in 1475 and it influenced the construction of maps by the addition of degree lines.

FIRST ATLAS OF CHARTS

The first atlas of charts is the *Spiegel de Zeaveardt* of Lucas J. Waghenar, published in 1584. The Dutch were the leaders in chart-making during the 17th century. After the Neptune Francois of 1693, the best charts came from Paris. These in turn were eclipsed by London in the second half of the 18th century. The Royal Hydrographic Office was founded in 1795, and it is interesting to note that the British Admiralty has been one of the leading producers of charts the world over. For expeditionary planning in Chicago Natural History Museum, these old Admiralty charts are invaluable in showing the location of the old places where specimens were found, and it is interesting to note that the charts, because of their historical recordings, proved to be more valuable on the Museum's Bermuda Expedition in 1948 than the more recent hydrographic office charts.

From the middle to the end of the 19th century, Germany was considered the headquarters of scientific cartography. Nuremberg and Cologne were two prominent centers in the theory and practice of geographical science. Martin Waldseemüller, a cartographer of note, was the scholar who gave America its name in his *Cosmographiae Introductio*. His map of the world, "Universalis Cosmographia," constructed as a globe in 1507, was an outstanding achievement. Today, the geographical establishments in Germany, particularly that founded by Justus Perthes (1785) at Gotha, occupy high rank.

The United States Coast Survey was founded in 1807 and was organized under Ferdinand Hassler, a Swiss cartographer. The first charts appeared in 1845, and since then charts of all the coasts of the United States and its dependencies have been produced. In 1878, the name of the office was changed to U.S. Coast and Geodetic Survey, after the great transcontinental arc of triangles from Atlantic to Pacific was carried through.

USE IN MUSEUM RESEARCH

Modern sea charts, outgrowths of the old Portolano Charts, are distinct aids to scientific research. In planning an expedition for the purpose of collecting marine fauna, for example, they play a role of much consequence. A systematic study of the charts covering the area to be visited is made, and oceanographic and ecological data compiled. The exact localities where the wanted or unknown specimens may be found are decided upon, the charts furnishing the essential data by their graphic presentation of coast elevations, contours, banks, reefs, depths, etc. In deep-sea dredging, the chart is used for the 1,000-fathom contour by fixing the exact position and bearings from the locality of the lighthouses, as in the recent Bermuda expedition. An examination of the chart determines how deep to set the traps or drag nets, whether the area is a closed-in bay or a reef in shallow water, whether the waters are too deep for the use of poison or too shallow to be good fishing grounds, whether a reef is exposed or what its coverage would be at low tide. It is important to know the temperature of the water, the fresh-water streams entering the bay and where, and if there is a lake at the head of such streams. The maps are used for information relating to accurate soundings, the currents and depth of the water, as well as the nature of the bottom: whether shell, gravel coral, etc. The nautical terms recorded on the charts are useful as is the additional data in each section of a chart referring to the size of the nearest town or towns and the prevalent language.

In planning a recent Museum expedition to Florida, charts in the Library were studied to determine the character of the waters and the region where collecting was to be undertaken. Before departure, the charts were marked with all the places where Chicago Natural History Museum already had collected. While in the field, the charts again came into prominence, insuring the safe navigation of the coastal and intracoastal waters, the determination of geographical positions and elevations not only along the coasts but in the interior of the country, and providing fundamental data for the scientific investigations undertaken. They were in constant use, for all pertinent data discovered are recorded on the charts, which are later placed on file

FLORIDA REPTILE COLLECTING

A field trip to Florida and adjacent areas to obtain material for the exhibits of reptiles and amphibians got under way with the departure April 17 of Staff Taxidermist Leon L. Walters and Assistant Taxidermist Ronald J. Lambert. In addition to collecting, they will make in the field plaster molds of many of the specimens and take photographs and color notes needed later for making plastic reproductions in the Museum laboratories. Among the specimens especially to be sought are: alligator snapping-turtle, red-headed skink, rainbow snake, indigo snake, diamondback rattlesnake, blind lizard, Florida king snake, American alligator, and water moccasin and a number of frogs and salamanders.

in the Museum Library and the Curators' offices not only as a valuable record but as part of the regular collection. Symbols are used in recording the necessary information, such as a circle to indicate the exact place where collecting is done and to show where the particular specimens come from. Later, smaller maps are redrawn from the large maps to show localities and to facilitate the work of future expeditions.

The Museum Library receives regularly many of the publications issued by the United States Coast and Geodetic Survey. These publications, covering works on the surveying and charting of the United States and its possessions, geodetic control, and other activities, include the annual reports, gazetteers, and coast and general charts. Among the publications of the United States Hydrographic Office received in the Library are the gazetteers to maps and charts and the sailing directions and pilot guides covering many regions of the world. The United States Hydrographic Office publishes the *International Code of Signals for the Use of All Nations*, of which a copy is in the Library.

It is now more than three centuries since Gerard Krehmer, better known to the world by the Latinizing of his name as Mercator, produced his large map of the world. The extent of the geographical knowledge of their time was graphically illustrated by the seamen in their Portolano Charts, and the beauty and technical perfection of their work has earned them the distinction of representing some of the finest examples of the science and art of that day. Since then, great progress has been made in the basic sciences stemming from these early documents, in astronomy, geology, and geography. The value of the Portolano Chart in its contribution to the interesting branches of the history of human progress and the growth of scientific research is almost unsurpassed.



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