CARTOGRAPHY
ON DOUBLE PROJECTION ORTHOMETRIC CHARTS

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Suppose two projections of the terrestrial sphere, one on the equatorial plane, the other on the meridian plane. The straight line distance between two points of the earth area is given by the hypotenuse of the right-angled triangle whose first right angle side is formed by the distance between the projection of these two points on the equatorial plane, the second right angle side being given by the space between the parallels passing by the projection of the two points in question, on the meridian plane. Such is the principle on which *our double projection orthometric charts* are based.

The earth is represented on these charts by its projection on the equatorial plane (*polar projection P.P.*), on the one hand. On the other hand it is represented by its projection on a cylinder passing by parallels 45° N. and S. (*cylindrical projection C.P.*). The special latter projection was selected instead of the projection on the meridian plane because, whilst preserving the space between the parallels it gives the constant scale areas; the meridians and parallels are straight lines at right angles; lastly together with the P.P., it offers, as a whole, a means of presenting all the earth area with the lowest maximum of scale distortion $(\sqrt{2})$.

This method was employed for the "Monde orthométrique" chart in two sheets, to the 1/25.500.000 scale on the P.P. parallels ; as a token of esteem, I offer to the Academy one of the two sheets, that of the Pacific.

For example, in order to find the distance between Honolulu (H) and Melbourne (M) we form a triangle XYC whose sides are :

X, distance HM on the P.P.;

Y, distance between the H and M parallels on C.P.

The hypotenuse C would be the straight line distance (chord) from H to M to the scale of 1/25.500.000.

This length C, plotted on the circular kilometric scale surrounding the P.P. equator, would give distance D as the crow flies, viz 8.875 meters.

Moreover, the distance S (taken between the extremity of distance D on the circular scale and the meridian passing by the origin O of the scale) may be transferred from M on the P.P., until it intersects meridian H in H'. This distance S, so transferred, gives the angle PH'M)South 43° 38' West) equal to the azimuth of M as seen from H. The same distance S transferred from H until its intersection with meridian M would also give the azimuth of H as seen from M.

The distances and azimuths between any two points being thus obtained, this method allows the solution of all problems of astronomic and radio bearing navigation, as stated in the explanatory pamphlet.

The "Monde orthométrique" chart has the advantage over other forms of planispheres of representing the whole of the earth with the least distortion, allowing at the same time, a direct measurement of areas, distances in a straight line and as the crow flies, as well as of azimuths, like on a 50 cm. diameter sphere, but without necessitating the use of either a spherical compass or flexible protractor. Its accuracy is sufficient for general information, for seismologic applications of epicentre determination and even for radio bearing navigation. It allows the measuring of azimuth angles with a much greater accuracy than that given by radiogoniometers.

This method is suitable for astronomic aerial or maritime navigation, which requires great accuracy, when used in connection with nautical orthometric charts representing the whole of the earth in 12 sheets to the scale of 1/10.000.000.