COMPLEMENTI DI NAVIGAZIONE AEREA

(COMPLEMENTS OF AERIAL NAVIGATION)

by

TEN. COL. NICOLO GALANTE.

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This course, which corresponds to the normal course given by Ten. Col. Nicolo GALANTE at the *Scuola di Guerra Aerea* (School of Aerial Warfare), is a compilation of several chapters dealing with the various problems of astronomical aerial navigation.

The first chapter gives the definitions of all the geometrical elements necessary for the solution of the problems of the celestial sphere. Chapter II contains a general discussion of the measurement of time and the system of time zones. The third chapter is devoted to definitions of the spherical co-ordinates of the stars, both on the celestial sphere and the local sphere. In the fourth chapter the author deals with the geometric determination of position and the fixing of position by means of altitudes of heavenly bodies. There are general notes on the various astronomical ephemerides, and in particular those which are published especially for aeronautics ; on the rating of chronometers ; observations by sextant and other reflecting instruments ; problems of the dip of the horizon and refraction are treated in detail. In this chapter, the longest in the book, are also given the methods of calculation of the spherical triangle for the determination of the line of position. There is a special application of nautical astronomical calculations to aerial navigation.

The fifth chapter is devoted to generalities concerning the various charts employed in navigation, first the MERCATOR chart, the charts on the stereographic projection, polar, meridian or general. Then the gnomic charts, polar, meridian and general, and certain cartographic projections obtained from the development of the cylinder, transverse or inverse (Charts of KAHN and of TONTA).

The sixth chapter contains general notes on the fundamental problems of orthodromic navigation and the representation of the orthodrome on MERCATOR and other charts.

The work ends with a series of exercises in theoretical navigation.

H. B.

INTERNATIONAL STANDARD PROJECTIONS
FOR METEOROLOGICAL CHARTS

In the *Monthly Weather Review*, December, 1937, W.R. GREGG and I.R. TANNEHILL, after a short historical account of action in the International Meteorological Organization on projections and scales used for meteorological charts, state the objectives of the resolutions adopted at Salzburg on 16th September 1937 by the Commission on Projections for Meteorological Charts and briefly discuss the same.

Three projections, all *conformal*, were recommended.

RESOLUTION II. — (a) *The stereographic projection for the polar regions on a plane cutting the sphere at* 60°.

(b) *The* LAMBERT *conformal conic projection for middle latitudes, the cone cutting the sphere at* 30° *and* 60°.

(c) MERCATOR'S *projection for the equatorial regions, with true scale at* 22 1/2°.

RESOLUTION VII. — *The Commission recommends that every chart for meteorological purposes have printed on its face the name of the projection and the scale at the standard parallels ; and that the scales be also printed on the chart at different latitudes.*

REMARKS. — The very large number of working charts used for compilation by meteorological services calls urgently for uniformity in projections and scales; the scales to be used were also specified in the Resolutions of the Commission.

Conformal projections were considered preferable to equidistant (equivalent) projections because, the angles being preserved in the former, wind directions are much more easily plotted thereon. The three selected projections have in addition the great advantage of representing the meridians by straight lines and the parallels by concentric circles or straight lines. They may be extended indefinitely in longitude, reaching around the world, and each country may select its central meridian for the sheet which it establishes without thus making it less easy to fit together sheets originating in different countries.

In *Hydrographic Review*, Vol. VI, N° 1, May 1929, the International Hydrographic Bureau gave very complete tables of the stereographic projection for the polar regions, calculated on the international ellipsoid between latitudes 30° and 90°.

Volume VII, N° 1, May 1930, contained, page 35, a description and study of the LAMBERT conformal conic projection.

International Hydrographic Bureau Special Publication N° 21 includes an accurate table of meridional parts, calculated on the international ellipsoid for the establishment of the MERCATOR projection.

By its Resolution N° VIII, the Commission allows the use of the equidistant projections corresponding to (*a*), (*b*) and (*c*) when special charts for climatology are required; however, it should be noted that those equidistant projections and the conformal projections are very nearly identical in the regions, in the vicinity of the pole for the first, in the middle latitudes for the second, and in the equatorial regions for the third. It will therefore be rarely necessary to resort to these equidistant projections.

P. V.