Using the sphero-geometry of insphered polyhedra to measure distances and areas on earth

Just as I have exploited the sphero-geometry of the insphered hexpenhedron, or mapped out football, within a geographic perspective in order to measure distances and areas on earth by using the "hex-pen" grid, it is also possible to use the sphero-geometry of the other insphered polyhedra for the same purpose. I have therefore mapped out the tetrahedron, hexahedron, octahedron, dodecahedron and the icosahedron, each in its insphered state and superimposed each of them onto an antipodes map for instant approximations of distances and areas which I consider the primary purpose of a map. Each such map gives the basic arc-angle distances and arced face area values of the respective insphered polyhedron, with reference to the oblate spheroid earth, as stated in "Characteristics of polyhedra (regular and insphered)". In the mapped out diagrams I have highlighted pairs of equal and congruent antipodal areas. Their congruencies, although not apparent from the diagrams, are based on sphero-geometry and the fact that the outermost circle in each map represents the magnified point of the north pole. I have not stated the geographic coordinates of the strategic points of all the mapped out polyhedra as they can be easily ascertained from the respective maps. Those of the dodecahedron and the icosahedron are, fortunately, the same as those of the mapped out hexpenhedron. It should be taken for granted that each mapped out polyhedron mentioned in this article is in its insphered state, thus avoiding the frequent repeat of the word insphered* to describe it. All the mapped out polyhedra, excepting that of the tetrahedron, are antipodal.

The perfect sphero-geometry of the "hex-pen" grid is validated

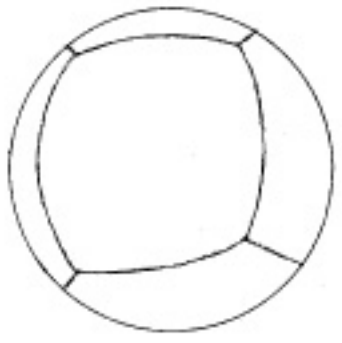
It is interesting to note the close alignments of the mapped out dodecahedron and of the icosahedron with the mapped out hexpenhedron. In each case, this synchronisation gives further confirmation of the correctness of the geographic coordinates of the strategic points of the "hex-pen" grid. This concurrence with reference to the strategic points validates the perfect sphero-geometry of the grid and also of the mapped out dodecahedron and the icosahedron. Arc-angle values, areas of segments, and routes of great circles in the maps of the tetrahedron, hexahedron and octahedron prove the perfect sphero-geometry of each polyhedron therein, although none of them align well with the mapped out hexpenhedron. Using the basic information given in each mapped out polyhedron, it is possible to plan a rotary grid for each of them on a similar pattern as the "hex-pen" grid to approximate distances and areas on the antipodes map in a macro manner. But I think that the "hex-pen" grid serves this purpose admirably in both a macro and micro manner.

An apology

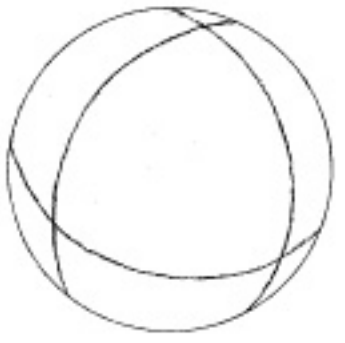
My diagrams may not be perfect, but the facts therein are correct. I had no recourse to sophisticated technological computers and relied only on elementary geometrical instruments, free-hand drawing and photo-copy machines for all the diagrams in my book,excepting the one in page 10.

Various football designs based on the polyhedra are shown below

insphered tetrahedron

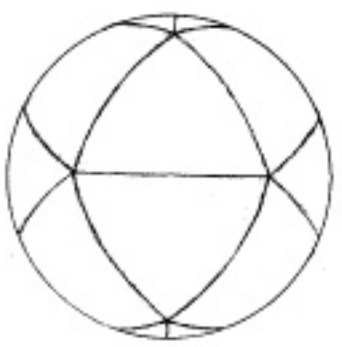


insphered hexahedron



insphered octahedron

insphered dodecahedron



insphered icosahedron

insphered hexpenhedron

* It is easy to imagine a polyhedron insphered within a ball, with its vertices just touching the curved vertices of the corresponding design. This is because each design reflects the characteristics of the related polyhedron which is insphered and radiated onto the surface of the football.