Schwann introduced Schleiden's errors into animal histology, reinforced by one of his own, namely, the idea that new cells originate chiefly between the old cells, not within them. On these mistaken ideas (the wrong definition of the cell and erroneous ideas of cell formation) Schwann built up his theory of the "conformity in the structure and the development of the cells in animals and plants". It remained for Max Schultze to correct, twenty-two years later (1861), the errors of Schwann's theory in the sense of Purkinje's ideas.

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Anat. Anzeiger, 1927, and *Acta Soc. natur.*, Brno, 1927.

The 'Butterfly' Map Projection

THE problem of reducing the sphere to a plane surface has ever been a difficulty. This realisation has led cartographers to adopt the policy of constructing a map for a specific purpose. The most important features which have to be embodied in maps may be classified in three categories: (1) exactness of shape; (2) exactness of area; (3) exactness of relative position. Whichever of these features will be required is decided by the purpose of the map, and when this has been decided a map is constructed on an appropriate projection. The required feature is embodied in the map, the others are ignored, with the result that distortion in some respect is usually apparent.

Mr. B. J. S. Cahill, of Oakland, California, has regarded this problem from a fresh angle. Instead of making one purpose dictate the form of the whole map, he has realised that in a world map the land areas may be required for one purpose and the water for another. There is also the uneven distribution of land and water over the globe.

The resultant map, constructed to serve many purposes, has been achieved by incorporating various projections into one final form, and by representing the globe by an octahedron (Fig. 1). Such a figure is capable of being more closely approximated to the sphere by the addition, on either face of the octahedron, of smaller tetrahedrons. Thus the principles of triangulation as applied in plane work are translated to the solid. Such an octahedron with tetrahedral modifications can easily be developed into a plane surface.

It must, however, be noticed that such a figure is a substitute for the globe and on development is a spherical representation and not a reproduction. The cube of the gnomonic projection is replaced by this modified octahedron.

The other unusual figure is the combination of various projections, namely, 1, 2 and 3. This gives rise to a grave defect when one remembers that an essential feature of any map is ease of interpretation. A form of projection frequently employed for statistical purposes is that of Mollweide. This is an equal area of projection and when constructed with the Greenwich meridian in the middle of the map, areas in remoter longitudes assume very distorted shapes. To obviate this difficulty the usual form of the projection is replaced by an interrupted form. Against such forms there has always been the accusation that they are not easy to read.

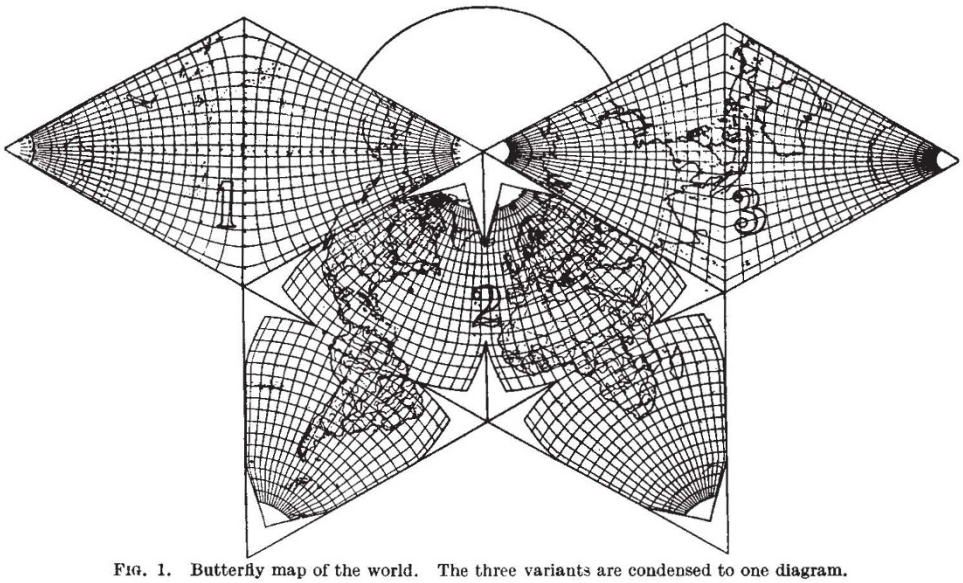

FIG. 1. Butterfly map of the world. The three variants are condensed to one diagram.

In the case of the 'butterfly' map this criticism will be made, and strongly asserted, because the continuative feature is missing. The faces numbered 2 do not conform to the original octahedral boundaries, whilst the junctions of the portions 1 with 2, 2 with 3 are not too happily made. Such breaches of continuity as are evidenced in tracing the 5° N. latitude and in north-west India (sheets 2 and 3) will require more than supplementing by simple graphic diagrams.

The use of this modified octahedron instead of a single plane is an advantage, but it cannot give a sphere, whilst the discontinuity due to the unhappy alliance of divers projections will scarcely "help mankind to learn to think planetarily".

J. E. COLECLOUGH.

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