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Edge Transitive Maps on Orientable Surfaces

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Jack Graver and I (1997) established that the automorphism group of an edge-transitive, locally finite map manifests one of exactly 14 algebraically consistent combinations (called *types*) of the kinds of stabilizers of its edges, its vertices, its faces, and its Petrie walks. Exactly eight of these types are realized by infinite, locally finite maps in the Euclidean or hyperbolic plane. H.S.M. Coxeter had previously observed that the nine finite edge-transitive planar graphs realize three of these eight planar types in the sphere.

In the past year, J. Siran, T. Tucker, and I have shown that for each of the 14 types and each integer n >= 11 such that n is congruent to 3 or 11 (mod 12), there exist finite, orientable, edge-transitive maps whose various stabilizers conform to the given type and whose automorphism groups are (abstractly) isomorphic to the symmetric group Sym(n). Exactly seven of these types (not a subset of the planar eight) are shown to admit infinite families of finite, edge-transitive maps on the torus, and their automorphism groups are determined explicitly. Thus all finite, edge-transitive toroidal maps are classified according to this schema.