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S. Allen Broughton* (brought@rose-hulman.edu) and **Christopher Judge**. *Flat Surfaces, Teichmueller Discs, Veech Groups, and the Veech Tessellation*. Preliminary report.

Flat surfaces were popularized as a tool in understanding the dynamics of a billiard ball on a polygonal table whose corner angles are rational multiples of π . However, the surfaces have become interesting in their own right and are powerful tools in the analysis of Teichmueller discs and Veech groups. A Teichmueller D disc may be thought of as a complex geodesic tangent curve in Teichmueller space through a given surface. The Veech group V is the subgroup of the mapping class group M that maps the disc to itself, and acts as linear fractional transformations on the disc. Normally, this is uninteresting unless D/V has finite area. In this case the image of D in the moduli space is a complex curve. In this talk, after introducing the main players, we will discuss an interesting tessellation on the Teichmueller disc D coming from flat surface analysis of the parametric family of surfaces defined by the disc. The automorphism group of the tessellation always contains the Veech group. The authors present some conjectures that, in the finite area case, the inclusion is of finite index. This gives an alternate approach to computing Veech groups. (Received August 21, 2009)