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Elizabeth Theta Brown, Emily Castner* (castn22e@mtholyoke.edu), **Stephen Davis, Edwin O'Shea, Edouard Seryozhenkov** and **Alfredo Vargas**. *Geometries in the Absence of the Side-Angle-Side Axiom*. Preliminary report.

The story of the parallel postulate and non-Euclidean geometry has been oft-told. Less studied as an axiom of geometry is the Side-Angle-Side rule for triangle congruence. Although SAS appears as a theorem in Euclid's Elements, its proof hinges on an implicit assumption of superimposition. We survey non-SAS geometries and axiom equivalences in the context of Hilbert's modern axiomatization of Euclidean geometry. Our perspective is informed by mathematical logic. Our main result is a novel proof that Euclid's parallel postulate is not equivalent to Playfair's axiom in the non-SAS context. (Received September 26, 2017)