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Heegaard surfaces and the distance of amalgamation.

Let M_1 and M_2 be orientable irreducible 3–manifolds with connected boundary and suppose $\partial M_1 \cong \partial M_2$. Let M be a closed 3–manifold obtained by gluing M_1 to M_2 along the boundary. We show that if the gluing homeomorphism is sufficiently complicated, then M is not homeomorphic to S^3 and all small-genus Heegaard splittings of M are standard in a certain sense. In particular, $g(M) = g(M_1) + g(M_2) - g(\partial M_i)$, where $g(M)$ denotes the Heegaard genus of M. This theorem can also be extended to manifolds with multiple boundary components. (Received August 18, 2008)