We introduce a new class of algebraic varieties which we call frieze varieties. Each frieze variety is determined by an acyclic quiver. The frieze variety is defined in an elementary recursive way by constructing a set of points in affine space. We give a new characterization of the finite–tame–wild trichotomy for acyclic quivers in terms of their frieze varieties. We show that an acyclic quiver is representation finite, tame, or wild, respectively, if and only if the dimension of its frieze variety is 0, 1, or at least 2, respectively. (Received August 20, 2018)