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Down with Symmetry!

. . . a little. In a natural way, the faces of ranks 1 and 2 in a 4-polytope $\mathcal{P}$ provide the vertices of a bipartite graph $\mathcal{G}$. Recently, Asia Weiss and I have examined this construction when $\mathcal{P}$ is a finite, abstract regular (or chiral) polytope of Schläfli type $\{3, q, 3\}$. If in this case $\mathcal{P}$ is also *self-dual*, then $\mathcal{G}$ must be 3-transitive (or 2-transitive). Here I discuss further work with the additional help of Egon Schulte and Tomaž Pisanski. We show that when $\mathcal{P}$ is *not self-dual*, then $\mathcal{G}$ is no more symmetric then it has right to be. Indeed, $\mathcal{G}$ is a trivalent *semisymmetric* graph, so that $\mathrm{Aut}(\mathcal{G})$ is transitive on edges but not on vertices.