I will explain constructions which produce combinatorial Hopf algebras from towers of algebras, and dual graded graphs from Hopf algebras. These constructions are studied to show that towers of algebras $\bigoplus A_n$ which give rise to combinatorial Hopf algebras must have $\dim(A_n) = r^n n!$ where $r = \dim(A_1)$. This is based on joint work with Bergeron and Lam. (Received September 20, 2010)