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Clifford A Reiter and **Jordan Olliver Tirrell*** (tirrellj@lafayette.edu), Farinon Box
7549, Lafayette College, Easton, PA 18042. *Pursuing the Perfect Parallelepiped.*

Whether there exists a parallelepiped with edges, face diagonals, and main diagonals all of integer length is an open question. We look at the structure of integer length vectors in dimensions two, three and four and develop an algebraic view of the structure of those vectors in three dimensions. Namely, we give matrix generators for producing all the 3-dimensional integer length integer vectors. Parametric families of parallelepipeds that have good properties and the results of computer searches for perfect parallelepipeds are described. (Received September 11, 2005)