1086-17-2397 **Tevian Dray*** (tevian@math.oregonstate.edu), Department of Mathematics, Oregon State University, Corvallis, OR 97331, **John Huerta** (john.huerta@anu.edu.au), Mathematical Sciences Institute, The Australian National University, Canberra, ACT 0200, Australia, **Corinne A. Manogue** (corinne@physics.oregonstate.edu), Department of Physics, Oregon State University, Corvallis, OR 97331, and **Robert A. Wilson** (r.a.wilson@qmul.ac.uk), School of Mathematical Sciences, Queen Mary University of London, London, E1 4NS, United Kingdom.
The symplectic nature of E_7*.* Preliminary report.

Freudenthal and Tits independently showed how to construct a Lie algebra from a pair of division algebras, with the exceptional Lie algebras corresponding to the octonions. The first two rows of this "magic square" are described by the Lie algebras of special unitary and linear groups, and a description of the third row in terms of the Lie algebras of (generalized) symplectic groups is also known. At the group level, the first two rows are well understood, including a geometric understanding of the minimal representations of F_4 and E_6 in terms of the Albert algebra. In the third row, the minimal representation of E_7 consists of Freudenthal triples.

In this work, we outline a new description of Freudenthal triples in terms of "cubies", the components of an antisymmetric rank-3 representation of (generalized) symplectic groups, thus providing a link between the two descriptions of the third row of the magic square, a unified, geometric interpretation of Freudenthal triples as a single object, and a new description of the minimal representation of E_7.

In future work, we hope to extend this construction to the fourth row, ultimately providing a unified description of the full magic square. (Received September 25, 2012)