1108-11-67 **William C. Abram*** (wabram@hillsdale.edu), 33 East College Street, Hillsdale, MI 49242, and **Artem Bolshakov** and **Jeffrey C. Lagarias** (lagarias@umich.edu). *Intersections of multiplicative translates of 3-adic Cantor sets.*

We discuss a 3-adic generalization of a question of Erdös on the ternary digits of powers of 2. Let $\Sigma_{3,\bar{2}}$ be the 3-adic Cantor set consisting of all 3-adic integers whose expansions omit the digit 2. The exceptional set $\mathcal{E}(\mathbb{Z}_3) \subset \mathbb{Z}_3$ consists of all 3-adic integers λ such that, for infinitely many n, $2^n\lambda$ is in $\Sigma_{3,\bar{2}}$. It is known that the exceptional set has Hausdorff dimension at most $\frac{1}{2}$, and it has been conjectured that it has Hausdorff dimension 0. We attempt to bound the Hausdorff dimension of $\mathcal{E}(\mathbb{Z}_3)$ by studying finite intersections of multiplicative translates $\Sigma_{3,\bar{2}} \cap \frac{1}{M_1}\Sigma_{3,\bar{2}} \cap \cdots \cap \frac{1}{M_n}\Sigma_{3,\bar{2}}$ for integers $1 < M_1 < \cdots < M_n$, and give a method to compute the Hausdorff dimensions of such intersections by first describing them as the one-sided infinite walks in a finite automaton initiating from a distinguished vertex. We obtain an improved upper bound on the Hausdorff dimension of $\mathcal{E}(\mathbb{Z}_3)$. (Received December 22, 2014)