1026-52-93 **Ralph Howard*** (howard@math.sc.edu), Department of Mathematics, University of South Carolina, Columbia, SC 29208, **Dmitry Ryabogin** (ryabs@math.ksu.edu), Mathematics Department, 138 Cardwell Hall, Kansas State University, Manhattan, KS 66506-2602, **Anamaria Rusu** (rusu@math.sc.edu), Department of Mathematics, University of South Carolina, Columbia, SC 29208, and **Artem Zvavitch** (zvavitch@math.kent.edu), Department of Mathematical Sciences, Mathematics and Computer Science Building, Summit Street, Kent, OH 44242.
Determining Symmetric Convex Bodies by the Perimeters of Their Central Sections.

Let $\mathcal{P}_k^n$ be the collection of all C^1 convex bodies K in $\mathbf{R}^n$ symmetric about the origin with the property that for all k-dimensional linear subspaces P of $\mathbf{R}^n$ $V_{k-1}(P \cap \partial K) = V_{k-1}(P \cap \partial \mathbf{B}^n)$ where $\mathbf{B}^n$ is the Euclidean ball. (That is $K \in \mathcal{P}_k^n$ is a centrally convex body with C^1 boundary and the property that the $(k-1)$-dimensional "parameter" of $P \cap K$ is the same as that of $P \cap \mathbf{B}^n$ for all k-dimensional central sections of K.) We show that in this class the ball is isolated in the sense that all one parameter analytic deformations of the ball in $\mathcal{P}_k^n$ are constant. This gives evidence to support the conjecture that if K_1 and K_2 are two convex bodies symmetric about the origin whose sections by any k-dimensional plane through the origin have equal perimeters, then $K_1 = K_2$, a question posed by Richard Gardner in his book *Geometric Tomography* in the case $k = 2$ and $n = 3$. (Received February 16, 2007)