1070-11-251 **Joshua Holden** (holden@rose-hulman.edu), Department of Mathematics, Rose-Hulman Insitute of Technology, Terre Haute, IN 47803, and **Margaret M Robinson*** (robinson@mtholyoke.edu), Department of Mathematics, 50 College Street, South Hadley, MA 01075. *Counting fixed points, two-cycles, and collisions of the discrete logarithm using p-adic methods.* Preliminary report.

Brizolis asked for which primes does there exist a pair (g, h) such that $g^h \equiv h \bmod p$. To rephrase, he asked if for $p > 3$ there is always a pair (g, h) such that h is a fixed point of the discrete logarithm $\log_g$. Zhang (1995) and Cobeli and Zaharescu (1999) answered with a "yes" for sufficiently large primes and gave estimates for the number of such pairs when g and h are primitive roots modulo p. In 2000, Campbell showed that the answer to Brizolis was "yes" for all primes. The first author has extended this question to questions about counting fixed points, two-cycles, and collisions (pairs (h, a) where $h^h \equiv a^a \bmod p$ where h and a are not necessarily primitive roots). In this paper, we use p-adic methods, primarily Hensel's lemma and p-adic interpolation, to count fixed points, two cycles, and collisions given certain conditions on g, h, and a modulo powers of a prime p. (Received February 14, 2011)