1047-11-343 **Alain Togbe*** (atogbe@pnc.edu), 1401 S. U.S. 421, Westville, IN 46391. *Variants the Diophantine equation $x! + 1 = y^2$.*

We study variants of the Brocard-Ramanujan Diophantine equation $n! + 1 = y^2$. In 1935, Erdős and Obláth showed that the Diophantine equation

$$y^d \pm 1 = n!$$

has no positive integer solutions (y, d, n) with $y > 1$ and $d \geq 3$. Recently, Berend and Harmse proved that the equation $n! = y^r(y+1)$ has only finitely many positive integer solutions (n, y) when $r \geq 4$ is a fixed integer. In this talk, we will discuss the recent progress and the variants of the problem. We will also show how we find all the integer solutions of this equation when $r = 2, 3$ under the additional assumption that $y + 1$ is squarefree or cubefree respectively. (Received February 02, 2009)