1035-05-756 **Allen J Schwenk*** (`schwenk@wmich.edu`), Department of Mathematics, Western MIchigan University, Kalamazoo, MI 49008. *The search for cages of girth 5 and 7.*

Hoffman and Singleton identified those values of r for which there can exist an r-regular graph of girth 5 and order r^2+1, namely r = 2, 3, 7, and possibly 57. It is also known that there are no r- regular graphs of girth 5 and order r^2+2. We consider r-regular graphs of girth 5 and order r^2+3. Using eigenvalue methods and Maple to factor large polynomials, we show the nonexistence of such graphs for 5 <= r <= 11. Similarly, no r-regular graphs of girth 7 and order r^3-r^2+r+1 exist. On the other side, we give a simple construction for the Robertson graph of order 19 with r=4, and for two graphs of order 12 with r = 3. (Received September 14, 2007)