186. Let $X_1, ..., X_n$ be independent and identically distributed random variables with mean $\mu = \mathrm{E}[X_i]$ and variance $\mathrm{Var}(X_i) = \sigma^2 > \infty$. For estimating σ^2, consider the unbiased sequence of estimators

$$S_n^2 = \frac{1}{n-1}\sum_{i=1}^{n}(X - i - \bar{X}_n)^2, \quad \text{where} \quad \bar{X}_n = \frac{1}{n}\sum_{i=1}^{n} X_i.$$

Use Chebyshev's Inequality to find a sufficient condition for S_n^2 to be consistent for σ^2.