(ii) The hypothesis is symmetric in $a_n$ and $\frac{1}{a_n}$. That is, if we let $\frac{1}{a_n} = \frac{1}{a_{n+1}}$, then the hypothesis is:

$$|\frac{1}{a_n} - \frac{1}{a_{n+1}}| \leq N \quad \forall n \geq 1.$$ 

$$\left| \frac{1}{a_n} - \frac{1}{a_{n+1}} \right| \leq N \quad \text{By what was proved in (i)}$$

$$\frac{1}{a_n} \leq 2^{n+1} + 1 \quad \forall n \geq 1.$$ 

Let $\frac{1}{a_n} = \frac{1}{a_{n+1}}$.

$$\frac{1}{a_n} \leq 2^{n+1} + 1 \quad \text{and} \quad \frac{1}{a_{n+1}} \leq 2^{n+1} + 1 \quad \text{or} \quad \frac{1}{a_{n+2}} \leq 2^{n+2} + 1$$

By the proof (given in (i)):

$$\left| \frac{1}{a_n} - \frac{1}{a_{n+1}} \right| \leq 1 \quad \frac{1}{a_{n+1}} \leq 2^{n+1} + 1 \quad \frac{1}{a_{n+2}} \leq 2^{n+2} + 1$$

Thus, we have:

$$\frac{1}{a_{n+1}} \leq 2^{n+1} + 1 \quad \text{and} \quad \frac{1}{a_{n+2}} \leq 2^{n+2} + 1$$

**Q.E.D.**