[74r]

Ockham
Monday. 4th Jan y ['1841' added by later reader]

Dear Mr De Morgan. We have had company ever since I last wrote to you, so I have been at a Stand-still, & only yesterday was able to read over with attention your replies. I am reluctant to trouble you again with remarks on the Series $1+\frac{x^2}{2}+\frac{x^4}{2.3.4}+$ &c, for it seems as if I was determined to plague you about it. However I feel I must do so. Your added [74v] remarks of last time, about B &c, are quite clear in themselves, but I felt at once that they did not meet my difficulty which was that as long as $\frac{5}{4}$ (which is greater than 1) is to be added to $\frac{1}{2}\sqrt{1000,000+\frac{1}{4}}$, it matters not whether for $\sqrt{1000,000+\frac{1}{4}}$ we substitute the whole number next above it or "the intermediate fraction" alluded to by you in the line I have marked [mark a bit like her '$\surd$'], but we never can bring out $n =$ to anything less than 502, whence $n+1$ the required term must [75r] be 503. This, after reading over & over, remains in my mind a most obstinate fact, and I believe I have found out the real source of the discrepancy between the result at the bottom of the first page & the top of the Second

one. I am presumptuous
enough to think there is
certainly an error in your
writing out, in the line I
have marked X, & it is one
which is very likely to have
occurred in writing ['it' crossed out] in
a hurry. __
The $(n+1)^{\text{th}}$ term divided by
the n^{th} is I believe n<u>ot</u>
[75v] $\frac{Z}{(2n-2)(2n-3)}$, but $\frac{Z}{2n(2n-1)}$,
and I have re-written & now
enclose the rest of the demonstration
(exactly like yours) with this
correction. The result comes
out as I expected, owing to
$\frac{1}{4}$ taking the place of $\frac{5}{4}$,
& everything appears to me
consistent. __ the n^{th} term
divided by the $(n-1)^{\text{th}}$ term
would be, (as you have
written) $\frac{Z}{(2n-2)(2n-3)}$, & this
correction would do instead of
the others, & be perhaps ['a' inserted] more
simple mode of making it,
as y<u>our</u> demonstration would
[76r] then remain correct, the $\underline{n}^{\text{th}}$
term being in that case the
required unknown one instead
of the $(n+1)^{\text{th}}$. _
I am afraid all this is a
little complicated to explain
in letters, & perhaps I have
still not succeeded very
perfectly in doing so; but
I feel it now all very
clear in my own mind,
& am only anxious to receive
c<u>onfirmation</u> as to my being
right, both as satisfactory
to me in the present instance,
& as tending to give me

[76v] confidence in future in
my own conclusions, or, (if
I am in this case puzzle-
-headed), a due diffidence
of them. ____
I therefore beg your indulgence
for being so teasing. ________
Believe me

Yours most truly

A. A. Lovelace