[110r]

Ockham
Monday. 6th July

Dear Mr De Morgan. Since dispatching my letter yesterday, I remember that I have not even quite fully & correctly stated the whole points of difference ['between' inserted] $\int \sqrt{a^2 - x^2} x^{n-2} dx$ and $\int \sqrt{v} d2u$. I think I stated that $\int \sqrt{a^2 - x^2} x^{n-2} dx = \int \sqrt{v} d2u . \frac{-1}{x}$, that in other words the 1st side differs from $\int \sqrt{v} d2u$ in containing a factor $\left(-\frac{1}{x}\right)$. But it differs also in containing dx as well, which in writing yesterday I omitted I believe to notice. So that $\int \sqrt{a^2 - x^2} x^{n-2} dx = \int \sqrt{v} d2u . \frac{(-1)}{x} . dx$ or the 1st side differs from $\int \sqrt{v} d2u$ in containing $-\frac{1}{x} . dx$. Is not this what I ought to have stated? Or is there still any confusion?

I also wish to observe upon what I wrote on Friday as to the application of the Differential & Integral Calculus to $\frac{gt^2}{2}$, [110v] that I am aware this formula ['$e = \frac{gt^2}{2}$' inserted] can be derived from $V = gt$, by the simple Theory of algebraical proportion ; but that I was anxious to know how it is derived in the other way.

I will with your leave ['(which I do not wait for)' inserted], send you my paper making it out on the doctrine of Proportions. __
You must tell me if I presume too much on your kindness to me. I am so engaged at present with my mathematical & scientific plans & pursuits that I can think of little else ; & perhaps may be a plague & bore to my friends about [something crossed out] these subjects ; for after my interruption from Paris & London pursuits & occupations, my whole heart is with my renewed studies ; & every minutia even is a matter of the greatest interest.

Believe me
Yours most truly
A. A. Lovelace

[111r] [something crossed out] You ['will receive' inserted] two papers on $e = \frac{gt^2}{2}$ tomorrow evening, or Wed[dy]. __ One of them is to show the absurdity of the supposition that the spaces might be as the velocities ; ['& that' inserted] on merely abstract grounds it could not be. __