

[46r]

[something written vertically here — belongs at end of letter so transcribed there]

Ockham
Monday. 4th Sep^r

Dear M^r De Morgan

Will you send on the enclosed to M^{rs} De Morgan. It explains the arrangements I have made in case she comes here, & also that Lord L__ & myself have delayed our own departure until Sat^{dy} next. Our household & children however are already gone.

Now to mathematical business : I think you have hit the right nail on the head, altho' my confused notion of Differentials was [46v] not the only piece of puzzle & mistiness which constituted the impediments towards my comprehension of $X \frac{du}{dx} + Y \frac{du}{dy} = U$. The rectification of this however, has I believe given me the key to the remaining difficulties. If you will be kind enough to read the ['following' crossed out] enclosed observations, you will be able to judge how far I now take a just view of the matter.

I find that when (a long time ago) I studied Chapter V, I never gave due importance to the conclusion

$$\Delta.u = \frac{du}{dx_1} \Delta x_1 + \frac{du}{dx_2} \Delta x_2 + \frac{du}{dx_3} \Delta x_3 + \&c \\ + \{(\Delta x)^2, (\Delta x_1 \Delta x_2), \&c, \&c\}$$

deduced at the bottom of page 87, as the result of pages 86, 87. My [47r] whole attention was given to the subsequent theorem of page 90, "If u be a function of t in different

“ways &c, &c”, which I conceived to be the only object in view, & that the equation of page 87 was of no consequence in itself, but merely means to an end. This seems to have been an egregious blunder, since the whole theory of Differentials rests on the very part which I [‘comparatively’ inserted] neglected, from [‘fancying it’ inserted] a merely subsidiary theory. I believe I am not wrong in this present view of the matter.

I cannot help here remarking a circumstance which I [‘believe’ crossed out] think is almost invariably true respecting all my difficulties & confusions in studying. They are without any [47v] exception that I can recal [*sic*], from misapprehension of the meaning of some symbol, or [‘of’ inserted] some phrase or definition ; & on no occasion from either any error in my reasoning, or [‘from’ inserted] any difficulty in carrying on [‘any’ crossed out] chains of deductions correctly, however complicated or profound or lengthy [‘these may be’ inserted]. I therefore have lately begun to ask myself, whenever I am stopped, whether I clearly understand what the subjects of the reasoning are ; & to go carefully over every verbal [something crossed out] & symbolic representative of a thing or an idea, with the question respecting each, “now what does it mean, & how was it got? “Am I sure of this, in each instance “involved in the subject?” This may save me much future trouble.

I will send you my remarks tomorrow, [vertical text on 46r] as I want to look over them once more

first ; & today I
have had enough of
these subjects.

Yours very truly
A.A.L