1 Wm Qt Georges Sq

20th Decr 1880

19/83

Dear George,

Thanks for yours note; I would just as soon Galbraith had taken Heat, but I am glad he has not taken much — (He is too dunkan manner)

I have been doing some of Haughtons papers, and there is an objection, as it appears to me, to everything in the paper beyond the first terms of V, inasmuch as terms in V with $\frac{d^2\xi}{dx^2}$ &c may be as important as terms of $\left(\frac{d\xi}{dx}\right)^2$, whereas he takes in the last and omits the first.

This objection I never brought up against McCullagh, because he does not set up with any theory as to how the form of V arises, that is from what

kind of internal forces, but assumes his V. Haughton however sets out by assuming that the action between his particles is a function of r, ρ_1, ρ_2 where r is the original distance, ρ_1, ρ_2 the altered ones, even though he does not assume that it is exerted in the line joining them — In this case I think that he is bound to include $\frac{d^2}{dx^2}$ &c in V if he goes in for his 45 ~~constan~~ coefs, than of $\frac{d^2}{dx^2}$ &c.

I dont know whether you will be too lazy to enquire into the point, but if you are you had better send me word otherwise as a few days after Christmas I will send you a short Sketch of what he ought to do, unless in the meantime I find I have been foolish — It is because it is a point in connection with things you have been working at yourself that I do this, otherwise I fear any reference to Haughtons papers would be quite sufficient for you.

The planetary theory idea is justified not on ~~Gothart's~~ Cheyne's reasoning nor on any reasoning similar to that in the Lunar theory but on a piece of ordinary arithmetical reasoning having nothing to do with approximations.

Wishing for you and yours all the Compliments of the Season, a hope which in your case I hope may meet with its fulfilement though in mine that is not possible

I am yours very sincerely

E. P. Culverwell.

19/83