Trinity College
Cambridge
March 5th 1877

2/2

Dear Sir

May I venture to trouble you with a difficulty about your paper on the electromagnetic field in the last vol of the Phil Trans.

You say (page 700) I shall assume with Prof Maxwell etc and refer to Electricity & Magnetism ii 824. I suppose then that in your expression $\frac{dE_3}{dQ} f + g$ the symbols have the same meaning as with Maxwell and clearly your expression may be got from his 824 by integration by parts but with Maxwell $\mathfrak{F}$ $\mathfrak{G}$ $\mathfrak{H}$ have a definite meaning being the displacements

P.S. I enclose a stamped addressed envelope in case you should have leisure to answer this letter

of a particle of the medium. You then
introduce for W at the top of page 703 a 2
the same expression that you have already used
on 693 putting $\varphi = \frac{4\pi}{K}$, but in this
expression $\xi\ \eta\ \zeta$ have an equally well
defined meaning, being given by the equations
$\dot{\xi} = \int \alpha dt$ etc. Thus your assumption
would appear to be identical with
the hypothesis that the magnetic force
at any point is the rate of change of the
displacement of the medium. Your mag-
netic force however is the result of a
vortex and I have some difficulty in
reconciling these two hypotheses
A further reference to Maxwell on page
703 leads to confirm the impression
that your $\xi\ \eta\ \zeta$ have the same meaning
as his. Maxwells idea seems to me to
be quite clear. Magnetic effects may be

time heating term as given by this equation
$\xi' = \alpha$ etc I cannot see how without further
assumptions your additional term
$\frac{d\xi}{dt} f +$ etc is to arise I hardly think Max-
wells arguments can be applied to account
for its existence unless we suppose that
$\xi \eta \zeta$ are translational displacements
If however we take Maxwells terms and
substitute on the right hand your equa-
tions the forces which arise from the
elastic yielding gluey medium and
then form the equations for $\dot\alpha \dot\beta \dot\gamma$ sup-
posing them as in the molecular vortex
theory actually to be angular velocities of
an element we arrive at your equations
but this implies the additional assump-
tion of fluid theory.

9/2

Thus hoping
Apologizing for writing I remain Yrs very truly
W. J. Glazebrook

W. Fitzgerald Esq

explained by vortices in a medium
9/2 When a wave of translational displacement traverses the medium other vortices are set up the original vortices being displaced and removing the product of their angular velocities from the expression for the kinetic energy of the medium The forces introduced by Maxwell in Section 827 would appear to have no connexion with electricity beyond the fact that they arise from the elastic yielding of the medium You however introduce forces depending on the electrostatic energy of the field. Of course I may be wrong in my hypothesis that you intend to make E n I mean the same as Maxwell If this be the case so that you are all the