

Pembury, Bangor

9. 2. 93

9/38

Dear Fitzgerald

I thank you very much for your letter of criticism with which on the whole I am disposed to agree. I had planned to give some further discussion and illustrations of Maxwell's theory of the medium, among them his own mechanical illustration and your model. But that part of the book though promised at p. 177 was accidentally omitted. It ought to have been given as an introduction to Chap. V; and you will see that this would have given the emphasis to the action in the medium just where it is most needed. I think of having a note printed and bound up with future copies of Part I which will help to remove this particular reproach.

With regard to the "direction of vibration of the ether" I mean precisely what you say. But no doubt the statement is not so full or so explicit as it ought to be. I hope however it will not lead to serious misunderstanding.

As to your statement that everything is

I do not know your paper on Faraday as it was postponed & I had to leave. I have since read the N.A. Rev.

publish it separately in some form or other. In that case I hope to do justice to J. I need hardly say that I should be very glad of any papers or references on this subject you can procure. Yours very truly

9/30 ~~known~~ about the direction of vibration is known experimentally up to the question of "what changes in the medium accompanies electric and magnetic displacement" I quite agree with d. What I referred to was the "medium of vibration of the ether". I can't think of anything going in whether it is experienced as electric force or magnetic induction which is not a result or manifestation of motion of a medium possessing inertia. The elastic jelly theory of the ether illustrates what I mean, though only imperfectly, as its rigidity requires explanation. When applied to explain the scattering of light by small particles, as in Lord Rayleigh's theory of the blue sky, this theory does so satisfactorily of the direction of vibration of the jelly be at right angles to the plane of polarization in a plane polarized beam.

Now whatever theory of the constitution and action of the ether is adopted (and anything hitherto thought of probably only dimly shadows the reality) I take it that the electric and magnetic forces or "displacements" correspond to motions of the ether, and ^{these} a wave must be vibratory motions. To the nature of these motions the Helmholtzian experiments give a clue by making known to us their analogues, but they do not settle the question at all as to what these motions are themselves.

The knowledge of these analogues & their relation to the plane of polarization is a great step in advance & I wish I had devoted another paragraph or two to the matter. But I was sorely put to it for want of space, and help from friends competent to advise me of obscurities & imperfections. I had ^{before being proposed} set about rewriting the Theory of Light, and if I succeed in making a better job of it I may