

14/7

Paignton Devon

30 Aug 93

My dear Fitzgerald, Yours of 25th takes me out of my depth. I remember a paper of yours in Nature 3 or 4 years ago, which I read and reread. But there seemed to me to be "deep double ditchis" in it. I was struck by the resemblance to the stress formulae, but there was evidently something behind which was taken for granted. From your last I infer that this was Lord Kelvin's turbulent theory. And that leads me to remark that it seems a pity that Lord K. has not found time to bring out his papers factors, for the benefit of scientific progress. vol 3 was delayed for long, and ^{of} his vortex papers, presumably for vol 4, there is no sign. But how can he find time for such trivial work when there are Corporations wanting his advice about electric lighting, advice which of course could not be obtained from any one save the P. of the R. S.!?

Considering the matter with only the most superficial knowledge of the turbulent theory, what strikes me particularly is, first, the ambitious

nature of your suggested developments of it, and next, what a difficult piece of work it would be to prove them, purely on the basis of the properties of liquid motion. I understand that you first make an ether by endowing the primary medium with special motions, and make matter too in the same way, and gravitation, electromagnetism and chemics follow. It may be so, but I certainly don't see my way to it at present. I shall, however, look up your Nature paper again, and see whether I can make anything more out of it now, with the assistance of your letter, though I expect I should have to go in for K's. turbulence first, & have not got it to read.

As regards your bones, I can understand that, having had similar feelings in my bones about several matters, in which I afterwards found full confirmation. Before afterwards found full confirmation. Before that it was instinct. I suppose. But that it is a good servant, is instinct, it is a bad master.

I am afraid, however, I am too old to tackle such a complicated and difficult

problem as the full consequences of vortex motion or of turbulent motion. To do that, a man should be 30 to 35 years old, when youthful enthusiasm has not evaporated, nor the power of continuous work. Macaulay, I think, is the sort of man for it. At any rate as regards the mathematical powers, I am doubtful about his physical instincts, because there is some very queer stuff in his big R.S. memoir. But he is progressive for all that. He used the scalar & vector potentials, and got into extraordinary difficulties in consequence. Now, however, in his last paper I see he has given them up and uses E and H , and it makes a great simplification. He ought to do the big memoir all over again in duplex style. I am sure he will learn something by it. Perhaps, however, if he did seriously attack the theory of the universe on the turbulent basis, he would be led away from it on to other lines. For such is the nature of man.

Yours sincerely
Oliver Heaviside.