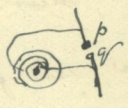
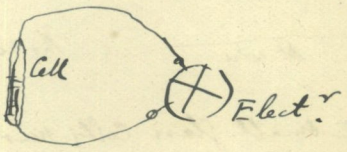
10/103 Φ,

Malahide, Englefield Green,
Surrey. Oct. 4/91.

I should have written to you long ago about certain points, but I did not know whether you were at home or not.
With only little delay reply to the points raised in this letter.
First, as regards Impulsion Cells, I had two ready for Sir H. Grubb to take over to you, but shown to him the extraordinary property of these cells; but he thought he might show them too much, & that it might be better to send them later on with the batteries for Monck's experiments.

Let the figure represent an Impulsion Cell connected with the poles of a Quadrant Elect.r; let





R be a Ruhmkorff Coil the poles of whose secondary Coil are p, q. To these poles long zinc plates can be attached, as in Hertz's exp.ts
Now by blowing suddenly on the wooden stand wh. supports the cell, we make it insensitive slightly; also by pronouncing the letter P (which involves a puff of air) we make it insensitive. When it is insensitive the spark passing between p & q, at a great distance will make the Cell sensitive. Two weeks ago I found that taking the Coil & a battery of grooves to work it out into a clear space in front of the Laboratory, its spark at a distance of nearly 150 feet from the cell made the cell sensitive from the insensitive state!
The Coil is now in the Lab.y at a distance of about 12 feet from the Cell, & I find that even when the distance between the knobs p, q is < 1/1000 of a millimetre, its spark affects the cell! If the knobs actually touch, it would do so.
Now am I right in saying that the length & period of the electromagnetic waves sent out by the spark between p & q are constant whatever the distance between p & q may be, and that the amplitude of the vibration alone is affected by this distance? Perhaps a greater quantity of electricity is set into oscillatory motion in a neighbouring wire when the distance between p & q is great; but this seems unlikely. What is the state of affairs as regards the waves & the distance between p & q?
With regard to screening by the interposition of wires, plates, &c. between the Coil and the Cell (or between the Coil and a Spark Micrometer, or anything whatever which is influenced by the Coil) I am not clear. I don't see why there should be any screening at all; because the plate or the wire which is interposed will act as a fresh source of electromagnetic disturbance itself, in consequence of the waves set up in itself. As a matter of fact, a metal plate will not screen the Cell, and a wire carried from the Cell towards the Coil will assist the Coil in altering the Cell. The inductive action on the Cell is propagated from one wire to another, although no wire touches the Cell and no wire touches another. If the Cell is enclosed completely in a metal box, I believe that it cannot be influenced; but I do not see clearly why.

large metal plates are fixed to the wires connecting the poles of the Cell with the Elect[r]. I have found (with some regularity) that the Cell is more easily influenced by feeble sparks. A small frictional gas-lighting machine at a distance of 10 feet altered the state of the Cell from insensitive to sensitive.

Cell plays the part of the Spark Micrometer in Hertz's experiments, but the Cell is hundreds of times more sitive to the feeble waves.

cannot find the theory of the Induction Coil anywhere — i.e., any discussion of the nature of the waves t art, as depending on the charging battery, distance between poles of secondary, &c.

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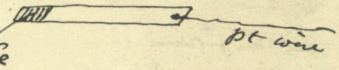
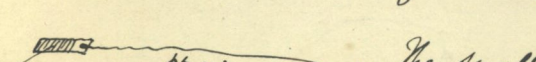
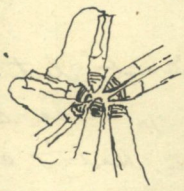
th regard to the Seleno-Aluminium Cells for telescopes, I am working out the best form, so as t 4 or 6 of them into the focal image of Jupiter; and I have been much delayed by the iscovery that it is very essential to insulate the back of the sensitised plate. This plate is aluminium coated at the end of one side by proper selenium, thus: 

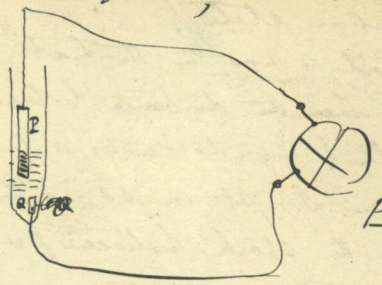
thus: 

. The smaller is the one I use now, and for a Jupiter battery,

arrangement of small glass cells must be like this: 
the very end of each cell containing the insensitive plate in each

sensitised tip of one of the aluminium plates in the Cell,
is a tiny speck of clean aluminium connected with a Pt. wire.
the Moon it will be easy to make a large battery, & no doubt of success with ♃'s light exist; but I want to get results from the Planets. For Sirius one cell is all that can used: its image is a point.

with what can I insulate the plate? The thing must not be acted upon by acetone. e trying now two things — viz., a solution of Gutta Percha in Chloroform, and a layer of black selenium itself. They seem to answer.



at is the seat of e.m.f. in the Cell? Observe this: let be a plate of aluminium sensitised at its end; let Q be the back ate. Now the more the plate P is lowered into the liquid, ance the e.m.f. given by the action of light on the selenium falls off. This looks as if the electricity was generated by d at the surface of contact of the Se and the acetone, the Se taking −, suppose, & the liquid +. m the liquid the + elect[y] flows to everything metallic in the cell, & hence some is communicated plate Q, & some to the uncoated parts of P which are immersed. Hence the Se gives the plate P & the acetone gives +, &. ∴ there is a falling off in its charge. This let I think must be the case. If so, the insulation of the uncoated parts of the plate to be absolute, because the liquid has a very high resistance.
ase a screw arrangement for lowering or raising the plate P and the falling off or ease of the e.m.f. when the light is shining on the plate is most marked & regular. e me any suggestion on this that you can.

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m at the vain & accursed work of writing a Hydrostatics & Elementary Hydrokinetics & ing it thro' the Clarendon Press.

10/103

M.