

As to lines of magnetic force not being
able to thread ^{perfectly} conducting circuits -
you will remember that it was
necessary for me to make all currents
flow in open circuit in order to
reconcile that fact to my views (see
paper, passim)

When you have really found out
why there is no Hall's I believe you
will have got to the bottom of
everything relating to electricity. So
I wait your attention.

I am glad to observe that the
dose of this stuff you have already
sustained has not wholly choked
you. Ever my sincerely

Thomson

24/11

ST JOHN'S COLLEGE,
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Jan 20. 55

My dear Fitz Sudd

We discussed surface
currents completely electric
displacements before (see paper, potenti
p. 764). It is I believe unassailable
that when a charge oscillates in
a conductor, - so long as the
current sticks to the surface
and does not run to the core of
the cylinder beneath a
sensible distance into the
conductor - that there is no
such thing as electric resistance.
In resistance it is known (and well

be true even a priori if it is at all
at all) that a wire resistor
vibrates fairly permanently. If any
such resistance impeded the flow of the
surface current this could not
possibly be. 24/11

The electric charge which thus
oscillates on the surface is no
doubt made up of mobile ions.

The above conclusion is that the
motion of these ions is unimpeded
, certainly by resistance, probably by
viscosity except the excessively
small inertia of free disembodied
electrons (paper § 114 seq.). Thus the
resistance of an electrolyte is
a thing belonging to dissociation

of molecules, not to transfer of ions
This accords with my view of recent
letters (also paper § 112 footnote, and
§§ 85-7) that the degradation of energy
into heat in conduction occurs
in the violent actions that take
place in the dissociation of the
molecules, and that regular effects
are a thing apart from thermal
phenomena. I believe it goes some
way towards proving that position.

I was much struck by all
this when working out periods of
vibration in endemics, and I
wished some discussion of the
point in a paper which is
now with the Math. Soc.