Now as to the method I intended to pursue in commencing the investigation. I intended first to prepare a number of resistances, metallic, but containing a very small piece of the substance to be experimented on. (Alum, allotropic sulphur, phosphorus, tellurium, &c. &c.) Then, by night, lighted only by a small candle, I intended to measure the resistances with a Wheatstone bridge. Having recorded the resistances by candle-light, I intended to again measure them by day in the open air, and full glare of the sunlight.

If I found any difference in any case, the substance in question could clearly be added to the same class as selenium, in having its resistance altered by <u>some</u> rays; <u>what</u> rays could be determined afterward. It seems to me that this line of investigation is fairly promising; but of course I cannot now carry it out.

Yours sincerely

J.R.Holt

23/56

dence of ether waves, is unique. It seems to me more likely that a similar property is possessed by several other substances, but that selenium is the only one affected by the visible waves, and consequently the only one which has attracted notice. Another consideration pointing the same way is this: we know that many substances, alum, for instance, are transparent to some radiations, and opaque or nearly so to others; now, it seems to me that the radiations which are stopped and absorbed by the substance must do some work on it, and in some way alter its molecular condition; of course the molecular conditipn might be altered without change of resistance, but this seems, in general, unlikely. Now supposing some some such substance found, and that its resistance was affected by the remote infra-red vibrations, below even the vibrations causing radiant heat, it is plain that by the aid of thissubstance we could carry on the mapping of the solar spectrum below the point to which it has been carried with the bolometer, working on the same principle as that used in that instrument. It is possible that glass would prove opaque to the radiations in question, but we ck could make our prism of someother material; in this case there would be a difficulty in determining the wave-lengths, but this might be subsequently got over. Of course, there may be no such radiations in the solar spectrum, but this appears unlikely.

23/5b

6 Harrington St.
16 Jan. 1893

23/56

Dear Mr. Fitzgerald

You are right as to the small effect which would be produced by electro-magnetic waves. I am surprised that this did not occur to myself. At the same time Lord Kelvin's theory seems to me anyhow you take it to present great difficulties. Granting that the Earth's rotation converts it into a magnet (by the way are rotating bodies converted into magnets? It seems to me that this could be to some extent tested by experiment.) this would only explain the p permanent magnetism; how about the secular changes? Are they due to changes in the Earth itself? This seems to me improbable. Are they due to an external body? If to the Sun, regarded as a powerful magnet, how does it act? I do not exactly see how mere changes in the intensity could produce variation in the direction in which the compass needle points. While, if the secular variation of the compass is connected with other secular changes, as the precession of the equinoxes, the solar magnetism must be indeed enormous to cause such large changes in this way.

Another subject on which I remember speculating, and intended to investigate when I found time and opportunity is as follows.

It seems to me most improbable that the property possessed by selenium, of having its electrical resistance altered by the inci-