the negative hydrogen atom to the positive pole of the oxygen atom. Oxygen atoms will also combine with each other in pairs but sometimes (at least with other diatomic atoms) in fours, like four bar magnets set up in a square. I don't exactly see how this analogy is to be carried on to atoms of higher atomicity but perhaps somewhat like this. The combination HO is monatomic as long as it sticks together there being only one oxygen pole free but it may be separated and will then combine with three atoms of chlorine or some other element. Can all triatomic de substances be really compounds like this?

Several chemical substances combine under the influence of light which is often cumulative. I mean to look up this point in connexion with the stars.

Sincerely yours
W H S Monck

16 EARLSFORT TERRACE,
DUBLIN.

Sept 22. 91

My dear Fitzgerald

I had a line from Monck today in which he says he thinks the Galvanometer will not do. He was unable to see the moon but tried an ordinary sperm candle at the distance of 6 feet with a Galvanometer of 7000 Ohms. The Galvanometer was acted on but the spot kept moving about so much that quantitative determination was impossible. He thinks the candle-light at this distance was probably superior to that of the full moon. I mentioned $\frac{1}{8}$ of an inch as the probable diameter of the circle where the

light of Jupiter (through telescope) was a little inferior to that of the full moon (received directly). He thinks he can make four cells to fit into those little circle for the electrometer.

I have been reading up a little chemistry lately for some points connected with Astronomy and was much struck (as I suppose you have been) with the analogy of some of the facts to those of electricity and magnetism. Thus if you take a simple monatomic body like hydrogen or chlorine it acts exactly as if one-half of the number of atoms were positively and the other half negatively electrified. The molecule consists of two atoms and no more – a combination of two being evidently neutral. But if you bring a pair of chlorine atoms near the pair of hydrogen atoms they will probably change places, producing two molecules of hydrochloric acid both of which again are neutral. But this new combination is much more likely to take place when the hydrogen or chlorine is in the nascent state i.e. is just being set free from some other combination. In this case some of the positive atoms of nascent hydrogen are wandering in search of negative atoms to combine with and combine readily with the negative chlorine atoms, there being in this case no combination of two hydrogen atoms to break up. Diatomic atoms differ from this by combining positive and negative poles in the same atom just like the two poles of a magnet. Bring an atom of oxygen near the doubled-atom of hydrogen and the positive hydrogen atom sticks to negative pole of the Oxygen atom and