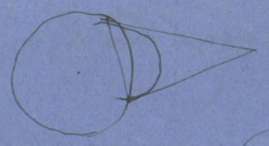
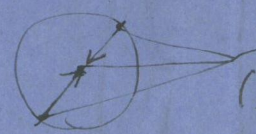
15/153





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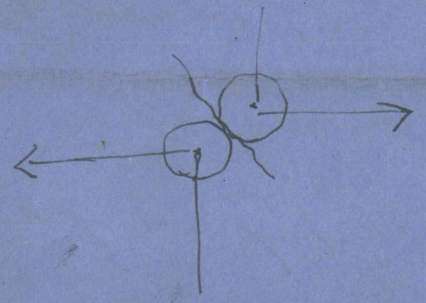
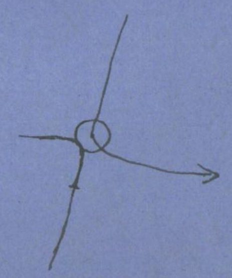




Annie
Raymond.
Nesta.
Mamma.
Miss Evans.

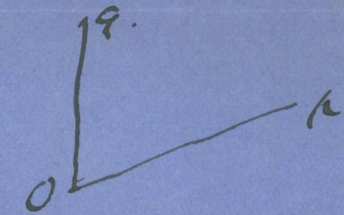
15/153

1 New Square
Lincoln's Inn
Jany 4 1895

Dear Professor Fitzgerald.

Apropos of your letter in Nature - I cannot convince Watson - I will ask you -
Elastic spheres are enough ~~to~~ elucidate the principle

~~Take~~ then an origin O. and let $f(p)\,dS$ be the number of pairs of spheres whose relative velocity passes through O and lies within the cone of solid angle dS described about Op as axis



If the pair collide then relative velocity after collision may be in any direction. Let the chance that it shall be within a cone of solid angle dS about Oq as axis be F_{pq}

Then the ~~$f(p)$~~ number which pass from the state Op to the state Oq is $f(p)\,F_{pq}$.

Similarly the number which pass from the

I have your dog

state O_q to the state O_p is

$f(q) F_{qp}$.

Watson now proves in his book that as a necessary condition for permanence

$f(p) F_{pq} = f(q) F_{qp}$. (in his notation $Ff = F'f'$)

that he proves to be true for all positions of p and q.

and he says F & f are continuous functions.

That and no more than that, he proves in his book.—

But that does not necessarily involve Maxwells distribution of velocities.— It completely fails to prove ~~it~~ Maxwells distribution to be the only permanent one which is the object of the whole business.—

But if you now ~~you~~ assume $F_{pq} = F_{qp}$ always you get $f(p) = f(q)$ for all positions of p and q. And that is Maxwells distribution.— On that assumption you do prove it

But now the assumption $F_{pq} = F_{qp}$ always is equivalent to the assumption that the collision coordinates are independent of the velocities.— which is exactly the assumption which I made a little more general indeed but I do not think anything is gained by the generality

Watson says he need not assume anything

If so he does not prove anything of value

I believe the whole theorem so far as it is of physical importance is that in nature the disturbing or mixing process is generally going on.— And that it is which brings about the independence of the space or $x\ y\ z$ coordinates & causes the system to tend to Maxwells distribution as limit

Yours

S. H. Burbury.