of course be little power in this arrangement, but it might answer with a strong current. The Sine is a better function to work with than the Tangent — obviously.

I could make the instrument easily myself with a wooden frame, using several hundreds of turns of fine wire. Shall I?

The Wollaston wire has not yet arrived.

π is in town.

No one who sees the Orang-Outang at the Aquarium can possibly doubt Darwin.

[I should have said that I have exposed, in same way, a piece of blue litmus paper uncoated with Collodion, & I humbly trust that when I revisit it, I won't find its exposed half altered].

P.S. I am, on second thoughts, inclined to believe that my Sine galv. arrangement, just described, is more ornamental than useful

I find that a given length of wire will make a better tangent galv. if bent into a square than if it is bent into a circle. The ratio is $\frac{\pi^2}{8\sqrt{2}}$, or $\frac{9869}{11312}$. Can this be?

10/123

26, Upper Baker St.
London.

Sept. 5

Φ,

I presume that by this time you have arrived at home, & completely recovered from the effects of the Red Lion dinner. Nature this week contains only the addresses of Presidents of Sections. I am slowly endeavouring under the perpetual heat (82 in shade!) to understand portions of Adams's address. There is one statement (among many) in it which I fail to understand. He says, "we may regard the sum of all the molecular forces as the specific heat of the body". "The body" is simply any solid. I cannot imagine how the sum of molecular forces could ever be a physical entity. The sum of forces never enters into anything, except the disordered brains of writers on Hydrostatics who are perpetually proposing nonsensical problems about the "whole pressure on a curved surface. The absurdity (by way of the sum of molecular forces being already

infinite, I cannot hope to make it greater by pointing out that of these forces some are tensions and others pressures, and surely they cannot be credited with the same sign.

10(123

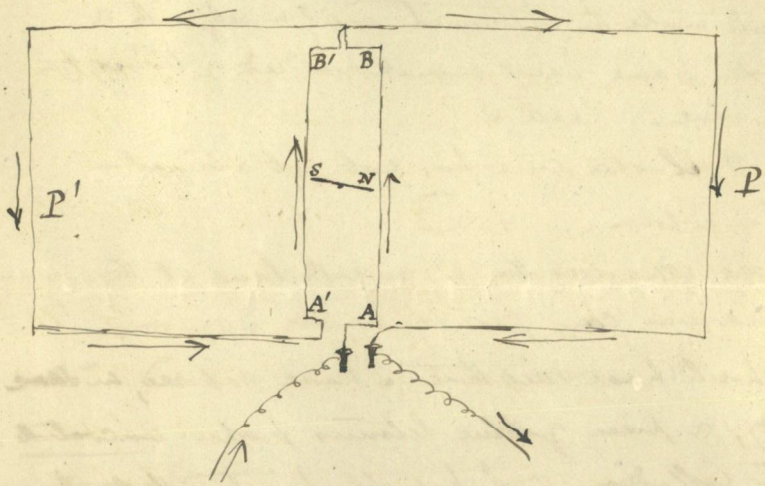
This occurs in Adams's account of Pictet's theory — "in wh. there are many things difficult to be understood". [It is quite possible that the remainder of the Apostles' words are applicable to me, however].

When I went to Loopers Hill and examined the blue Litmus paper wh. I left exposed in the window, the portion wh. was exposed to light was completely converted into a whitish red, & the other portion, wh. was screened from the light by having a rather light piece of wood placed over it, was strong blue, as at first. This, I think, promises well. Remember the whole was coated with pure Collodion. The air, I imagine, must have had free access enough to the unexposed part. I have placed it now in a dark drawer, so that the air can certainly get at it.

What is the value of the angular deflection in Thomson's reflecting Galvan.? Tyndall talks of "a Galvan. whose deflections are proportional". I deny the existence of any such instrument!!!!

Perhaps an Astatic Galv. comes somewhere near it.

I submit to you the following arrangement for an immoveable Sine Galvanometer: —



The fig. represents one turn of the wire along a wooden frame fixed perpend.r to Mag. Meridian. AB and A'B' are two (practically) infinitely long vertical wires the distance between wh. = NS = length of needle; needle's centre is fixed in middle of space between them. The currents in the horiz.l portions are mutually destructive in their actions on needle, & the effects of the currents in the vertical wires P, P' are negligible, the needle is small.

You will find by Calculation that if θ is deflection of needle from Mag. Meridian,

$$\sin\theta \propto \frac{C}{l},$$

where C = Cur. [illegible]