II. "On the Action of Light on Tellurium and Selenium." By Prof. W. G. Adams, F.R.S. Received November 10, 1875.

Two platinum wires were attached to the ends of a small bar of tellurium, about 1 inch in length, by heating the wires to a bright red heat and bringing them suddenly in contact, one with each end of the bar. The platinum wires melted a small portion of the tellurium, and became imbedded in it. The resistance of the bar and wires was about half an ohm. The tellurium was placed in a box, and its resistance balanced; then it was exposed to the light of a paraffin-lamp, just as in the experiments with selenium. At first the light seemed to have no effect; but in consequence of the heat from the lamp, the resistance of the tellurium was increased.

On placing a rectangular vessel of water between the lamp and the tellurium and then exposing as before, there was no change of resistance in the tellurium, showing that if there was any diminution in the resistance due to the action of light it was entirely balanced by the increase in the resistance due to heating by the current and by the residual portion of the radiant heat.

On replacing the rectangular vessel of water by a beaker of water, so as to focus the light of the lamp on the tellurium, there was found on exposure to be a *diminution in the resistance of the tellurium*, which gradually increased until the galvanometer-needle was deflected through 30 divisions of the scale. The needle was then brought back to zero by altering one of the slide-resistances in the circuit. The agreement between the amounts of the change of resistance in several successive experiments, with intervals between them, was very close. Thus, in three experiments on October 8th,

The change	in the	first	experiment	was	124	millims.	of wire,
,,	,,	second	,,	,,	120	,,	,,
,,	,,	third	,,	,,	122	,,	,,

showing a diminution in the resistance of the tellurium amounting to about one thousandth part of its whole resistance on exposure to the light of the paraffin-lamp.

On repeating the experiments with the tellurium which had not been exposed to light for seven days, the tellurium was found to be much more sensitive. When exposed at a distance of about half a metre, as before, to the paraffin-lamp the needle was gradually deflected through 30 divisions of the scale, showing that the resistance of the tellurium was now *diminished* as much without interposing the beaker of water as it had previously been when the beaker was interposed. On making no change whatever, except placing the beaker of water between the lamp and the tellurium, so as to focus the light on the tellurium, the deflection of the needle gradually increased to 80 and then more slowly to 100 divi-

sions. On balancing this deflection, it was found that, to bring the needle to zero, it was necessary to diminish the slide-resistance by 400 millims. Thus the diminution produced in the resistance by exposure to the light of the paraffin-lamp was $\frac{1}{300}$ part of the whole resistance of the tellurium.

On exposing the selenium bar used in my experiments to the direct rays of the same paraffin-lamp at the distance of 1 metre, the resistance of the selenium was diminished by one fifth of its whole resistance.

From the above experiment we see that at the distance of half a metre (that is, with light of four times the intensity) the change of resistance in the tellurium under the same conditions is only $\frac{1}{1000}$ part of its whole resistance.

On exposing the selenium to a constant source of light at different distances, the change in the resistance of the selenium on exposure for 10 seconds (as measured by the swing of the galvanometer-needle) is almost exactly inversely as the distance, *i. e.* directly as the square root of the illuminating power. This law is true whether the source of light be 1 candle or an Argand lamp whose illuminating power is equal to 16 candles.

Taking the mean of a number of experiments, all of which agreed pretty well together, the deflections at the several distances were :—

	At $\frac{1}{4}$ metre.	At $\frac{1}{2}$ metre.	At 1 metre.	At 2 metres.
With Argand lamp	..	170	83	39
,, candle..........	..	41	18	8
,, candle..........	82	39	18	8

Another series of experiments with a candle and Argand lamp (when the illuminating power of the lamp was equal to 12 candles), both at the distance of 1 metre, gave the following results :—

With the candle the deflection was 19 in 10 seconds.
,, Argand lamp ,, 66 ,,

The ratio of the deflections is very nearly 1 to $3\frac{1}{2}$.

These experiments clearly show that the change in the resistance of the selenium is *directly as the square root of the illuminating power.*

[*Correction.*—In my former paper on this subject (Proc. Roy. Soc. vol. xxiii. no. 163), on page 536, line 15, omit the word "opposing," and line 21, for "which opposes" read "in the same direction as;" also on page 539, line 25, for "which opposes a" read "in the same direction as the"; to the end of line 26 add "but in the opposite direction."]

III. "On the Refraction of Sound by the Atmosphere." By Prof. Osborne Reynolds, Owens College, Manchester. Communicated by Prof. Stokes, Sec. R.S. Received November 22, 1875.

(Abstract.)

This paper may be said to consist of two divisions. The first contains an account of some experiments and observations undertaken with a view