FOR THE YOUNG FOLKS.

Having finished the task we proposed to ourselves at the outset: "The Wonders of Astronomy," and as we hope with credit to ourselves, and satisfaction to our readers, we shall now turn our attention to a cognate subject,

LIGHT AND DISTANCE.

CHAPTER I.

SOMETHING ABOUT ILLUMINATION.

FROM time to time we hear of plans to illuminate whole cities by a great light from a single point. The credulity of the newspaper public about affairs belonging to Physics is so great, that we are not surprised if such plans are spoken of as practicable; though, indeed one needs but to cast a glance of reflection on them, to be at once convinced of their impracticability.

The impracticability does not consist so much in this, that no such intense *light can* be made artificially as in the circumstance that the illuminating power of light decreases enormously as we recede from it.

In order to *explain this to our* readers, let us suppose that on some high point in Montreal City, say Notre Dame Church steeple, an intensely brilliant light be placed, as bright as can be produced by gases or electricity. We shall see, presently, how the remoter streets in Montreal would be illuminated.

For the sake of clearness, let us imagine for a moment, that at a square's distance from Notre Dame Church there is a street, intersecting Notre Dame at right angles. We will call it "A" street. At a square's distance from "A" street let us imagine *another* street running *parallel to it*, which we will call "B" street; and again, at a square's distance, a street parallel to "B" street, called "C" street; thus let us imagine seven streets in all—from "A" to "G"—running parallel, each at a square's distance from the other, and intersecting Notre Dame at right angles. Besides this, let us suppose there is a street called "X" street, running parallel with Notre Dame and at a square's distance from it; then we shall have seven squares, which are to be illuminated by one great light.

It is well known that light decreases in intensity the further we recede from it; but this intensity decreases in a peculiar proportion. In order to understand this proportion we must pause a moment, for it is something not easily comprehended. We hope, however, to present it in such a shape, that the attentive reader will find no difficulty in grasping a great law of nature, which, moreover, is of the greatest moment for a multitude of cases.

Physics teach us, by *calculation and* experiments, the following:

If a light illuminates a certain space, its intensity at twice the distance is not twice as feeble, but two times two, equal four times, as feeble. At three times the distance it does not shine three times as feeble, but three times three, that is nine times. In scientific language this is expresed thus: "The intensity of light decreases in the ratio of the square of the distance from its source."

Let us now try to apply this to our example.

We will take it for granted that the *great light on Notre Dame steeple* shines so bright, that one is just able to read these pages at a square's distance, viz., on "A" street.

On "B" street it will be much darker than on "A" street; it will be precisely four times darker, because "B" street is twice the distance from Notre Dame Church, and 2x2=4. Hence, if we wish to read this on "B" street, our letters must cover four times the space they do now.

"C" street is three times as far from the light as "A" street; hence it will be nine times darker there, for 3x3=9. This page, in order to be readable there, would then have to cover nine times the space it occupies now.

The next street, being four times as *remote from* the light as "A" street, our letters, according to the rule given above, would have to cover sixteen times the present space, for it is sixteen times darker than on "A" street.

"E" street, which lies at five times the distance from the light, will be twenty-five times darker, for 5x5=25. "F" street, which is six times the distance, we shall find thirty-six times