cording to the ingenious explanation of my friend, high magnifying powers facilitate the discovery and recognition of the

champ du télescope sera d'autant plus tranchée qu'on fera usage d'un grossissemont plus fort."

"The eye is endowed with only a limited sensibility; for when the light which strikes the retina is not sufficiently strong, the eye is not sensible of any impression. In consequence of deficient intensity, many stars escape our observation, even in the darkest nights. Telescopic glasses have the effect of augmenting the intensity of the images of the stars. The cylindrical pencil of parallel rays emanating from a star, and striking the surface of the object-glass, on whose circular surface it rests as on a base, is considerably contracted on emerging from the eye-piece. The diameter of the first cylinder is to that of the second as the focal distance of the object-glass is to the focal distance of the eye-piece, or as the diameter of the object-glass is to the diameter of the part of the eye-piece covered by the emerging rays. The intensities of the light in these two cylinders (the incident and emerging cylinders) must be to one another as the superficies of their bases. Thus, the emerging light will be more condensed, more *intense*, than the natural light falling on the object-glass, in the ratio of the surface of this object-glass to the circular surface of the base of this emerging pencil. As the *emerging pencil* is narrower in a magnifying instrument than the cylindrical pencil falling on the object-glass, it is evident that the pupil, whatever may be its aperture, will receive more rays, by the intervention of the telescope, than it could without. The intensity of the light of the stars will, therefore, always be augmented when seen through a telescope.

"The most favorable condition for the use of a telescope is undoubtedly that in which the eye receives the whole of the emerging rays, and, consequently, when the diameter of the pencil is less than that of the pupil. The *whole of the light* received by the object-glass then cooperates, through the agency of the telescope, in the formation of the image. In natural vision, on the contrary, a portion only of this light is rendered available, namely, the small portion which enters the pupil naturally from the incident pencil. The intensity of the telescopic image of a star is, therefore, to the intensity of the image seen with the naked eye, as the *surface of the object-glass is to that of the pupil.*

"The preceding observations relate to the visibility of one point or one star. We will now pass on to the consideration of an object having sensible angular dimensions, as, for instance, a *planet*. Under the most favorable conditions of vision, that is to say, when the pupil receives the whole of the emerging pencil, the intensity of *each point* of the planet's image may be calculated by the proportions we have already given. The *total quantity of light* contributing to form the whole of the image, as seen by the naked eye, will, therefore, be to the *total quantity* of the light forming the image of the planet by the aid of a telescope, as the surface of the pupil is to the surface of the object-glass. The comparative intensities, not of mere isolated points, but of the images of a planet formed respectively on the retina of the naked eye, and by the intervention of a telescope, must evidently diminish proportionally to the superficial extent of these two images. The linear dimensions of the two images are to one another as the diameter of the object-glass is to that of the emerging pencil. We therefore obtain the number of times that the *surface* of the magnified image exceeds the *surface* of the im-