

For the Daguerreian Journal.

## LIGHT.

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The quantity of light which is given out from a body, or its intensity, is capable of being measured. The instruments which accomplish this are termed *photometers*. That invented by Leslie is the one chiefly used to measure the strength of the sun's rays. It consists of his differential thermometer with one ball made of black glass. This thermometer is simple in its construction. It consists of a tube doubly bent, so as to resemble the letter U, with bulbs blown upon each upper end; some colored liquid, generally alcohol, occupies a portion of the tube, and the rest is filled with air: the bulbs are closed, so as to protect them from atmospheric exposure. It is generally used to measure delicate quantities of heat, by exposing one of the bulbs in the warmth where the air which occupies it expands, and, pressing downward, drives the liquid up the next column, where it may be read off the scale. When applied to estimate Light, it is necessary to blacken one bulb. The clear ball transmits all the light that falls upon it, and therefore its temperature is not affected; it is all absorbed on the contrary by the black ball, and by heating and expanding the air within causes the liquid to ascend in the opposite stem. The instrument is covered with a thin plate of glass, to prevent the bulbs from being affected by currents of cold air. The action of this photometer depends on the absorption of the heat by which light is accompanied, and is liable to some exceptions when applied to other artificial lights, as the luminous and heating rays are not always in the same ratio; on this account it is not applicable to lights which differ in color.

When a ray of light falls on any substance, it is either thrown off again from its surface, where it is said to be reflected, or it enters the substance, and does not pass out again from it, when it is said to be ab-

sorbed, or it enters the body, and passes out again unaltered, when it is said to be transmitted; the latter substance is said to be *transparent*, and the two former *opaque*.

There is, however, no substance known, which is either perfectly opaque or perfectly transparent. Even gold may be beaten so thin as to be pervious to light. On the other hand the clearest crystal, the purest water, or air, stops or absorbs its rays when transmitted, and gradually extinguishes them as they penetrate to greater depths. On this account objects cannot be seen at the bottom of very deep water, and many more stars are visible to the naked eye from the tops of mountains than from the valleys. The quantity of light that falls upon any transparent substance is always greater than the sum of the reflected and refracted rays.

Bodies which reflect all the rays appear white, those that absorb them all seem black; but most substances, after decomposing the white light which falls upon them, reflect some colors and absorb the rest. A violet reflects the violet rays alone and absorbs the others. Scarlet cloth absorbs almost all the colors except red. Yellow cloth reflects the yellow rays most abundantly, and blue cloth those which are blue. From this it is evident that color is not a property of matter, but arises from the action of matter upon light. A white ribbon reflects all the rays, but when it is dyed red, the particles of the silk acquire the property of reflecting the red rays most abundantly, and of absorbing the others. The colors of transparent bodies are due to this cause.

A perfectly homogeneous color is rarely to be found, but the tints of all substances are most brilliant when viewed in light of their own color. The red of a wafer is more vivid in red than in white light; but, if placed in yellow light, it no longer appears red, because there is not a single ray of red in the yellow light. Were it not that the wafer, like all other bodies,