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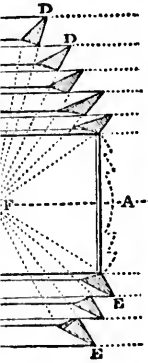

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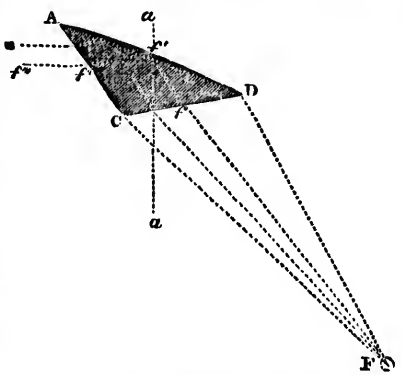
who was connected with the French Commission des Ponts et Chaussées, a short time before the death of M. Augustin Fresnel.

One of the most important improvements which took place in pharology was the daptation of this accessory on a much larger scale than had previously been supposed ossible, by the suggestion of Mr. Alan tevenson, who, in his construction of the kerryvore Lighthouse, used every means o render this important edifice most complete in every respect. In conjunction with M. Leonor Fresnel and M. François, an., the constructors, this apparatus was dded to the lower portion of the Skerryore dioptric light, consisting of five glass ones, which replaced in the ordinary ystem four horizontal zones, each composed of thirty-two concave mirrors. In fixed light apparatus of the first order, ineteen of these catadioptric zones replace leven reflecting zones.

"Nothing can be more beautiful," says Ir. Alan Stevenson, "than an entire aparatus for a fixed light of the first order. t consists of a central belt of refractors, orming a hollow cylinder, 6 feet in diaeter and 30 inches high; below it are six riangular rings of glass ranged in a cylinrical form, and above a crown of thirteen ings of glass, forming by their union a ollow cage composed of polished glass, 10 eet high and 6 feet in diameter. I know f no work of art more beautiful or creitable to the boldness, ardour, intelligence, nd zeal of the artist."



A D C will represent a section of this glass zone, which is so placed with regard to the focus, F, that a ray falling upon it at *f* will be at such an angle on D A, that instead of passing out, it will be *totally reflected* from that point of incidence, as *f f''*, and will finally assume the direction, *f'' f'* of a right angle to the normal, a a, as required. This angle, in passing from glass into air, is about 41° 49′, and a greater angle of incidence gives a reflected ray. In the largest zone, the radius of the arc (the reflecting surface), D A, is equal to 28·46 feet, and the angle, D C A, is equal to 117° 26′ 42″.

The divergence of the polyzonal lens is uch less than that of the parabolic reector, being about 5° 9′, owing to the smaller angle subtended by the flame upon the nner surface of the lenses. From this cause, the flash in a revolving light is but of hort duration, while that from revolving reflectors lasts much longer, from their reater powers of divergence. To compensate for this, the light from the lenticular pparatus is, within a certain distance, continuous; the upper and lower portions of he system giving a steady light.

Fixed and Flashing Lights.—There is one character of light in the French nd other) systems which is peculiar, and requires special mention, as it does not ppear to be properly understood by many, and is frequently an important distinction. his, the *feu fixe varié par une éclat* of Fresnel, has this appearance in a light whose eriod is four minutes: first, a bright fixed light, for above 3½ minutes; then a short, ut not total eclipse, for about 10 seconds; then a very bright flash, of much greater ntensity than the preceding fixed light; then another short eclipse, and then the xed light as before. In the larger apparatus the distinction between this and an rdinary revolving light is well marked by the intensity of the fixed light between ne brighter flashes, and also especially by the short eclipses preceding and following ne bright flash. In the smaller apparatus the bright flash is not so well marked; ut the short eclipses will be a clear index to its character.

There are different modes of producing this effect. Fresnel's plan was to have an rdinary fixed light apparatus, around the outside of which two revolving panels of efractors passed in regular succession. These panels consisted of *vertical* lenses, milar to the *horizontal* central belt. They thus received on their inner surface all ne light which issued from the central lamp through the fixed lens on the angle