. The apparatus is on the catoptric principle ; but the reflec- tors, which are illuminated by means of Argand lamps, are of polished tin-plate, and of small dimensions. The light is from spermaceti oil, the produce of the American South Sea fishery ; but experiments have lately been made upon oil produced from cotton-seed ; and there is some probabi­lity that this oil will be universally employed in the light­houses of America.

There are many questions of much interest regarding Lighthouses, which appear to open an extensive field of in­quiry ; and it may be doubted whether some of them have received that degree of consideration to which their import­ance entitles them. Amongst these we may rank the nu­merous questions which may be raised regarding the most effective kind of distinctions for lights. Those distinctions may be naturally expected to be the most effective which strike an observer by their *appearance* alone. Thus a red and white light, a revolving and a fixed light, offer *appear­ances* which are calculated to produce upon the observer a stronger sense of their difference, than the same observer would receive from lights whose sole difference lies in their revolutions being performed in greater or less intervals of time. On the other hand, the distinctions derived from time, if the intervals on which they depend do not approach too closely to each other, appear to afford very suitable means for characterising lights ; and the number of distinctions which may be founded upon time alone are pretty numerous. Co­loured media have the great disadvantage of absorbing light, and the only colour which has hitherto been found useful in practice is red, all others, at even moderate distances, serving merely to enfeeble without characterising lights. In the system of Fresnel, as already explained, all the distinctions are based upon time alone. Mr. Robert Stevenson, the engineer of the Northern Lighthouses, has invented two dis­tinctions, which, although they are produced by variations of the time, possess characteristic *appearances,* sufficiently marked to enable an observer to distinguish a light without counting time. Theone is called a *flashing* light, in which the flashes and eclipses succeed each other so rapidly, as to give the appearance of a succession of brilliant scintillations; and the other has been called *intermittent,* from its consisting of a fixed light, which is suddenly and totally eclipsed, and again as suddenly revealed to view. The effect of this light is entirely different from that of any revolving light, both from the great inequality of the intervals of light and darkness, and also from the contrast which is produced by its sudden disap­pearance and reappearance, which is completely different from the gradual diminution and increase of the light in re­volving lights, more especially in those on the catoptric prin­ciple. The great and still increasing number of lights renders the means of distinguishing them one of the most important considerations connected with lighthouses.

Not less important, and very nearly allied to the subject of distinction, is that of the arrangement of lights on a line of coast. The choice of the most suitable places and the as­signing to each the characteristic appearances which are most likely to distinguish it from all the neighbouring lights, are points requiring much consideration; and it ought never to be forgotten, that the indiscriminate erection of light­houses soon leads to confusion and that the needless exhibi­tion of a light, by involving the loss of a distinction, may afterwards prove inconvenient in the case of some future light, which time and the growing wants of trade, may call for on the same line of coast. To enter at length upon this topic, or even to lay down the general principles which ought to re­gulate the distribution of lights, would exceed the limits of this article ; but in connection with this it may be observed, that the superintendence of lighthouses should be committed to one general body, and ought not to be left to local trusts, whose operations are too often conducted on narrow principles, with­out reference to general interests. The inconveniences arising

from interference between the distinctions of the lights under one trust, and those of the lights under another, are there­by avoided ; and the full advantage is obtained of the means of distinction at the disposal of both.

Another important general inquiry, is that regarding the most advantageous height for lighthouses ; but this subject is so extensive, and embraces the consideration of so many circumstances, that we can only glance at the chief elements of the question. The distance at which lights should be seen, depends very much upon their position in relation to the dan­gers of the coast ; those which are outposts beyond the dan­ger, require a less extensive range than those which, from unavoidable causes, are situated landward of the dangers which they are intended to point out. Upon this cir­cumstance chiefly depends the height to which a lighthouse tower should be carried ; but in many climates, the fogs by which the upper and lower regions of the atmosphere are ob­scured, introduce elements into the question, which, it is to be feared, must baffle all general rules.

The following works may be consulted on the subject of lighthouses : Smeaton’s Narrative of the Eddystone Light­house. Lond. 1793. Stevenson’s Account of the Bell- Rock Lighthouse. Edinburgh, 1824. Belidor, Architec­ture Hydraulique, vol. iv. p. 151. Peclet, Traité de l’éclair­age. Paris, 1827. Fresnel’s Memoire sur un Nouveau Système d’éclairage des Phares. Paris, 1822. Admiral de Rossel’s Rapport, contenant l’exposition du système adopté par la Commission des Phares pour éclairer les côtes de France. Paris, 1825. Treatise on Burning lnstruments, containing the method of building large polyzonal lenses. By David Brewster, LL.D. F.R.S. Edin. 1812. Fanale di Salvore,nell' Istria, illuminato a gaz. Vienna, 1821. OnCon- struction of Polyzonal Lenses and Mirrors of Great Mag­nitude, for Lighthouses and for Burning Instruments, and on the Formation of a Great National Burning Apparatus. By David Brewster, LL.D. F.R.S. *(Edin. Phil. Jour.* 1823. vol. viii. p. 160.) Account of a New System of Illumina­tion for Lighthouses. By David Brewster, LL.D. F.R.S. Edin. 1827. Saggio di Osservazione, or Observations on the Means of Improving the Construction of Lighthouses ; with an Appendix, on the Application of Gas to Light- houscs. By the Chevalier G. Aldini. Milan, 1823. Bordier Marcet’s Notice descriptif d’un fanal à double aspect, &c. Paris, 1823. Bordier Marcet’s Parabole Soumise à l’art, ou Essai sur la catoptrique de l’éclairage. Paris, 1819. L. Fres­nel’s Description Sommaire des Phares et Fanaux allumés sur les côtes de F rance, au 1er. d’Août. 1837. Stevenson’s British Pharos. Leith, 1831. The Lighthouses of the British Islands, corrected to July 1836, from the Hydrographical Office of the Admirality. Lond. 1836. Instructions pour le service des Phares Lenticulaires, par L. Fresnel. Paris, 1836. The Lighthouses, Floating Lights, and Beacons of the United States in 1838 ; prepared by order of Stephen Pleasonton, fifth auditor of the Treasury, and acting commissioner of the revenue. Washington, 1838. Captain Leontey Spafarieff's New Guide for the Navigation of the Gulf of Finland. St. Petersburg, 1813. Coulier's Guide des Marins. Paris, 1825. Stevenson’s Sketch of Civil Engineering in Ame­rica. London, 1838, p. 296. Report of Select Commit­tee of the House of Commons on Lighthouses. 1834. Re­port by a Committee of the Board to the Commissioners of the Northern Lighthouses, on the Report of the Select Committee. 1836. Report to the Commissioners of the Northern Lighthouses, on the lllumination of Lighthouses, by Alan Stevenson, M. A. Edin. 1834. Report to the same Board on the Inchkeith Dioptric Light, by Alan Steven­son. Edin. 1835. Report on the Isle of May dioptric Light, by Alan Stevenson. 1836. Report on the Isle of May Light, by a Committee of the Royal Society, (Professor Forbes, reporter.) Edin. 1836.