not intercept an explosion from olefiant gas, would prevent it with fire-damp.

The combustibility of different gases is, to a certain extent, in direct proportion to the masses of heated matter required to inflame them. A red-hot wire, one fortieth of an inch in diameter, will not ignite olefiant gas, but it will inflame hydrogen gas; and the same wire heated white-hot, will inflame olefiant gas, but will not inflame the carburetted hydrogen of the coal-mines, which fortunately is the least combustible of the inflammable gases. The cooling power of metal, in regard to flame, is well shown by encircling a very small flame with a cold iron wire, which instantly causes its extinction. The interruption of the flame, therefore, in the author's safety-lamp, depends upon no recondite cause, but is simply referable to the cooling power of the wire-work tissue.

From the facts contained in the first part of this paper, the author conceives that the light of meteors depends not upon the ignition of inflammable gases, but upon that of solid bodies; that such is their velocity of motion, as to excite sufficient heat for their ignition by the compression even of rare air; and that the phenomena of falling stars may be explained by regarding them as small incombustible bodies moving round the earth in very excentric orbits, and becoming ignited only when they pass with immense rapidity through the upper regions of the atmosphere; while those meteors which throw down stony bodies, are similarly circumstanced, combustible masses.

Some new Experiments and Observations on the Combustion of gaseous Mixtures; with an Account of a Method of preserving a continued Light in Mixtures of inflammable Gases and Air without Flame. By Sir Humphry Davy, *LL.D. F.R.S. V.P.R.I.* Read January 23, 1817. [*Phil. Trans.* 1817, *p.* 77.]

Having shown, in a former communication, that the temperature of flame is considerably greater than that required for the ignition of solid bodies, the author thought it probable that, during the combination of certain gaseous substances, the heat evolved might be adequate to the incandescence of solid matters exposed to them, though insufficient to render the gases themselves luminous, or, in other words, to produce flame.

In a combustible mixture of coal-gas and air, the author suspended a small wire-gauze safe-lamp, in which some fine platinum wire was fixed above the flame; and when the inflammation had taken place within the cylinder of gauze, the quantity of coal-gas was increased, under the idea that the heat acquired by the mixed gas in passing through the wire gauze would prevent the excess from extinguishing the flame. When this happened, the wire of platinum continued to glow, though there was no inflamed gas in the cylinder; so that the oxygen and coal-gas in contact of the wire seemed to burn without flame, and yet produced heat enough to keep the wire ignited. This conclusion was verified by introducing a hot platinum wire into a

proper mixture of coal-gas and air. It became white hot, and continued so till the mixture had lost its inflammability. Mixtures of other inflammable gases afforded similar phenomena, and likewise several inflammable vapours, as those of ether, alcohol, oil of turpentine, and naphtha. In these experiments, platinum wire is most successfully used; for it does not tarnish, and its radiating powers are slight. Palladium answers nearly as well; but the phenomena are not witnessed when wires of silver, copper, or iron are employed. It is suggested that many theoretical views will arise from the connexion of the facts detailed in this communication with those presented to the Society in the author's former paper on flame; and practical applications may also flow from the same source. By hanging some fine platinum wire, for instance, above the wick of his safety-lamp, the coal-miner will be lighted in mixtures containing such excess of fire-damp as to be no longer explosive; and where the flame is extinguished, the metal will become sufficiently luminous to guide him, while its relative brightness in different parts of the mine will indicate the state of the air, and its fitness for respiration; for when the foul air forms two fifths of the volume of the atmosphere, the ignition of the wire ceases.

De la Structure des Vaisseaux Anglais, considérée dans ses derniers Perfectionnements. Par Charles Dupin, *Correspondant de l'Institut de France, &c. Communicated by the Right Hon. Sir* Joseph Banks, *Bart. G.C.B. P.R.S.* Read December 19, 1816. [*Phil. Trans.* 1817, *p.* 86.]

Being engaged in collecting materials for a work entitled "A Picture of Naval Architecture in the 18th and 19th Centuries," the author was induced to visit this country, with a view to become acquainted with the various innovations and improvements lately introduced here in the art of ship-building; and, in the present communication, offers some remarks upon the plans proposed by Mr. Seppings, an account of which has formerly been before the Royal Society, and is printed in their Transactions for 1814.

After giving an outline of the fundamental principles upon which Mr. Seppings's improvements in naval architecture principally depend, and dwelling especially upon the diagonal pieces of timber which he employs to strengthen the usual rectangular frame-work, the author proceeds to state that similar contrivances were long ago suggested and even practised by the French ship-builders, in order to give strength to the general fabric of their vessels. Instead of making the ceiling parallel to the exterior planks, they arranged it in the oblique direction of the diagonals of the parallelograms formed by the timber and the ceiling, in the whole of that part of the ship's sides between the orlop and limber-strake next the kelson. They then covered this ceiling with riders, as usual, and placed cross-pieces between them in the direction of the second diameter of the parallelogram. This system, however, was abandoned in the French