May 19, 1840.

The **PRESIDENT** in the Chair.

Peter Bruff was balloted for and elected an Associate.

“Description of a new Gas Regulator.” By James Milne.

The object of this instrument (which the inventor exhibited in Gas Regt action, and presented to the Institution) is to regulate the supply of lator. gas to burners, so that any variation in the pressure, arising from extinguishing the adjacent lights along the line of the street main, or in the different floors of manufactories, shall not affect those lights which are supplied through the regulator.

The regulator consists of a cylindrical outer case, to which is affixed a water gauge to show the pressure; to the top is attached an inner cylinder, open at the lower end and reaching nearly to the bottom of the outer case; the gas is introduced from beneath by a tube in the centre, terminating in a conical valve at the top: the male part of the valve is fixed by three arms to the top of a float, which moves freely in the space between the inner cylinder and the centre tube; the areas between the outer case and the inner cylinder, and between the inner cylinder and the centre tube, being alike, the pressure of the gas acts upon the water within the inner cylinder, and causes it to rise in the outer case just as much as it is depressed in the inner space. This depression carries down the float with the male part of the valve attached to it, and thus diminishes the aperture of the supply pipe, until the pressure is relieved by other burners being lighted, and enables the supply of gas to be in proportion to the demand. The pressure may be regulated at will by increasing or diminishing the quantity of water in the cylinders, and it is shown correctly by the graduated glass gauge. This apparatus has been found, in an experience of two years, to effect a saving of about 20 per cent., independent of its ensuring a perfect equality to all the burners in action. Drawings of the instrument accompanied this communication.

Mr. Lowe believed the “gas regulator” to be an efficient instrument. It was of the utmost importance that the light from gas should be steady and equal, as the nerves of the eye were more injured by an

unsteady than by an intense light. In large establishments, the greatest care would scarcely prevent constant variation in the lights, so that an efficient means of producing regularity must be valuable.

“On the Properties and Chemical Constitution of Coal, with Remarks on the Methods of increasing its Calorific Effect, and preventing the Loss which occurs during its Combustion.” By Charles Hood, F.R.A.S., &c.

The properties and chemical constitution of coal.

It appears that, previous even to the invasion of the Romans, coal was used as a fuel in Great Britain; but such was the prejudice against it, that wood was the fuel generally in use among the higher classes until the eighteenth century, when the supply of it diminished so considerably as to render necessary the substitution of coal; and from that time the increase in its consumption has been immense.

Previously to the seventeenth century, the smelting of iron and all other metals was performed by charcoal; but the attempts of Sturtevant and Ravenson in 1612-13 and of Dudley in 1619 to introduce the use of coal or coke in blast furnaces having proved the possibility of success, the progress of the innovation, though slow, was certain, and led to the transfer of the iron works from many of the original positions in the midst of forests to the coal districts where they are now placed.

The author considers his subject under three heads:—1st, The chemical character and composition of coal; 2dly, Its properties as a combustible; and 3dly, The nature and application of its various gaseous products.

The chemical character of coal.

1st. The opinion that coal is a compound of carbon and bitumen has been objected to by some chemists, on the ground that by no process hitherto pursued in analyses has it been possible to resolve it entirely into these two substances: even at a low temperature a quantity of gaseous matter is thrown off, and at an elevated degree of heat an evident decomposition of the bitumen takes place. Even anthracite contains a small portion of volatile matter, its component parts being carbon, oxygen, hydrogen, and nitrogen; the hydrogen being either combined with the oxygen to form water, or with a small portion of carbon to form carburetted hydrogen, which exists in a gaseous state in the pores of the coal. In bituminous coal, the hydrogen is combined with a larger proportion of oxygen and