duce combustion, should combine with the carbon; but, as we cannot, except in a limited way, regulate the admission of oxygen, the element of combustion, or at least, we cannot increase or diminish the amount contained in a certain volume of atmospheric air, it is requisite that we should do the next best thing; gage the amount of fuel subjected to the action of the atmosphere. No more coal should be put on a fire at one time than will readily ignite and give off a pure white blaze —not a blue flame, which denotes the presence of unconsumed gases—and that the fire should be undisturbed on the top.

This is an important element in the management of coal fires. "Jack Downing" once said. in his celebrated letters, that a coal fire was like a politician, "poke him on the top, his popularity, and he went down. Punch him at the bottom, his character, and he went up." The trouble with some of our politicians now is, that they have so little bottom or character, that if poked they go out like an insufficiently attended coal fire.

In clearing the grate in the morning there is a quantity of unburned coal, which has been externally subjected to combustion. It is covered with ash, and looks to the inexperienced eye like cinder. It is often relentlessly dumped into the ash box. The fact, in many cases, is, that the lump is only roasted on the outside, not even coked, and is in a better condition for igniting than the green coal. We have stated that coal is a *condensed* form of carbon. The superficially burned lumps found in our grates or among our ashes, sufficiently prove this. But take a lump of anthracite coal from the fire red hot and all alive. Throw it into water until the ashes are washed from it, and it is black externally, and cool. Take it out and break it open with a hammer and you will find it red hot and glowing inside. This shows that time and a plentiful supply of air are necessary to burn coal, and that large amounts of what we call ashes and cinders are really excellent fuel.

To prove this fact, let any one carefully sift his ashes, throwing out the inevitable slate, which can be readily detected, and start his coal fire on wood or charcoal, kindling his coal fire with the savings. He will find that he can get a good bed of incandescent coal sooner than with green coal on the kindlings. We have experimented with coal for twenty years, both in the house and under boiler, and we know whereof we speak. We shall allude to this subject again, taking up the burning of bituminous coals and the different plans of stoves and furnaces.—*Scientific American.*

The Iron and Copper of Great Britain.

The products of the British iron mines in 1865, were 9,910,045 tons, valued at the place of production at $16,644,025. This was used to feed 656 blast furnaces, and was converted into 4,819,254 tons of pig-iron. Of this 543,018 tons were exported, and the remainder occupied 6,407 puddling furnaces; and 730 rolling mills were employed in converting it into finished iron. The production of copper has been for some time declining, both in quantity and quality. Last year 82,562 tons of ore was imported, in addition to vast quantities in cakes, and manufactured.

Machinery and Manufactures.

DYEING FABRICS AND YARN.

A Mr. John Lightfoot has taken out an English patent for dyeing, the object of which is to dye, print, or stain a fast black from analine on wool, silk, feathers, or other animal substances or fabrics made from wool, and also fabrics made of a mixture of animal and vegetable substances, such as delaines, and similar mixed goods.

For mixed goods I wince or steep them in a solution of hypochlorite of lime, commonly known as a chemick, or a mixture of hypochlorite of lime, hydrochloric acid, and water, for the purpose of preventing the deoxidizing properties of the animal fibres and substances, thereby rendering them capable of receiving the aniline black.

Although I have here named only hypochlorite of lime, I wish it to be understood that other similar oxidizing agents will answer the purpose, such as hypochlorous and chlorous acids, hypochloric, chloric, and perchloric acids or a solution of their salts of alkaline or metallic bases. Other oxidizing acid salts, such as nitric acid, nitromuriatic acid, bichromate of alkalies, and permanganate of alkalies, will produce a certain effect; but I prefer as more economical and of greater utility, the chlorine mixtures before described. When the wool or animal substance is thoroughly oxidized to its maximum, and in a fit state to receive the aniline black already named (by oxidation being understood the change, whatever it may be, that animal fibres undergo, when exposed to the substances described), it may be known by the following simple test;—Take a dilute solution of permanganate of potash in two test tubes, and into one put a piece that has not been oxidized, and apply a gentle heat; the solution containing the one that is in a fit state to receive the aniline black remains pinky, but the other is decolorized immediately.

The proportions for preparing the wool are about as follow;—I take for every pound of cloth, wool, yarn, silk, delaine, feathers, or animal substance (well cleaned) six gallons of water at about 100 deg. Fah., two and a-half ounces by weight of hydrochloric acid of commerce, and one pint of hypochlorite of lime in solution, containing sixteen ounces of hypochlorite of lime per gallon. I keep the goods in this solution for from twenty to thirty minutes, or until the wool becomes quite yellow; I then wash well in water and dry.

I am aware that wooden fabric and fabrics of mixed wool and cotton have been previously steeped or prepared in mixtures containing chlorine or hypochlorus acid for the purpose of subsequently printing or dyeing such fabrics with ordinary colors not aniline black, but the chlorodizing or oxidation sufficient for such purposes is not applicable to aniline black, and a point of oxidation or chlorodizing is required which would not be advisable to give to fabrics intended for ordinary colors.

In dyeing coburgs and similar goods the present processes involve two operations; first, the cotton has to be dyed, and then the wool or silk. I avoid this twice dyeing by preparing the mixture of cotton, wool, silk, or other animal substance as