

IRON FOR SMELTING.

ts which are employed in gas-works
 lation of coal, a coating of very pure
 ometimes called graphine—gradually accu-
 es. It adheres to the surface of the metal and
 in thin scales. No other substance has been
 and equal to it for making the carbon points of
 lectric lights. It has a metallic lustre, resembles
 lack lead in appearance, and it makes marks upon
 paper similar to those of a plumbago pencil. Carbon
 is one of the most wonderful substances in nature.
 Under different conditions, it possesses diverse
 properties. In one state it is the brilliant diamond,
 prince of gems; in another it is black opaque coal.
 As plumbago, it is one of the most fractious of sub-
 stances, it being used for crucibles in which iron
 may be melted without producing the least appear-
 ance of fusing it. How different are the properties
 of plumbago, which cannot be burned, and the coal
 which is employed to warm our houses and smelt
 the hardest of metals; and yet they are the same
 substance in a chemical sense. The carbon which
 forms on the interior of gas retorts, although it is
 very hard and greatly resembles plumbago, is
 quite different in its nature as it respects combusti-
 bility. At a high heat, it burns freely, and could it
 be obtained in sufficient quantities, it would surpass
 all other kinds of fuel for smelting iron. When
 used in cupola furnaces for smelting pig iron to be
 used for casting, three tons of it will smelt as much
 iron as five tons of common anthracite coal. Being
 so pure, none of the heat is absorbed—as is the case
 with anthracite—by ashes, and as a consequence a
 far more intense heat is generated in the furnace.
 Indeed, the heat obtained in a cupola furnace from
 gas carbon is so intense that it will fuse fire-bricks.
 It is well known that the quality of iron is greatly
 affected by the character of the coal that is employed
 to reduce it from the ore, or melt it in the pigs for
 casting. Very small quantities of sulphur and
 phosphorus in the coal and coke employed for smelt-
 ing iron tend to render it brittle and deficient in
 tenacity. This is the reason why wood charcoal is
 so superior for smelting purposes. It contains nei-
 ther sulphur nor phosphorus, while mineral coal al-
 ways contains certain quantities of them. In Pitts-
 burgh and the Ohio valley very great value is at-
 tached to those coal seams which contain the
 smallest amount of sulphur, because such coal pro-
 duces the best iron when it is used for smelting. A
 discovery by which coke could be made from bitu-
 minous coal as cheaply and as pure as the graphine
 carbon in gas retorts would be a most valuable ac-
 quisition to the practical arts. Iron could be smelted
 with it at much less cost, and the quality of the
 metal would also be vastly improved by its use.
 Such a discovery should not be considered impossi-
 ble, for this substance is derived from the very same
 coal that produces common coke.

COAL TAR PERFUME.

Coal tar has a most disagreeable odor, and yet the
 chemist obtains from one of its products a most
 agreeable perfume. This is nitro-benzole—a com-
 pound of nitric acid (aqua-fortis) and benzole. Coal
 tar when distilled yields naphtha, which is a liquid
 possessing great solvent powers. It dissolves gutta-
 percha, india-rubber and many resinous gums.
 Naphtha when distilled at a low temperature yields
 benzole, which is a very volatile liquid. It has been
 used for making gas for illumination upon a small
 scale without distillation, but it is chiefly employed
 for cleansing soiled gloves, silks, &c. It dissolves
 grease and oils, hence its utility in cleaning light
 and soiled articles. Benzole combines with nitric
 acid in definite proportions, and forms the heavy
 oily-looking liquid called nitro-benzole. Its odor is
 like that of the oil of almonds, and it is extensively
 used in perfumery as a substitute for it. We have
 also seen it stated that it is used in confectionary
 as a substitute for the oil of almonds. This is a dan-
 gerous application of it, because it is a poison, and
 is deeply injurious to the human system when taken
 in very small quantities. As a perfume, it may be
 employed without much danger, but its use for this
 purpose should also be avoided. It may be safely
 assumed that it is not required excepting to disguise
 unpleasant odors.

SORGHUM SUGAR—CONVENTION OF CULTIVATORS AND OTHERS.

A large convention of cultivators of the sorghum
 and imphee and manufacturers of sirup and sugar
 was held at Springfield, Ill., in the first week of
 last month. Indiana, Illinois, Wisconsin and Iowa
 were represented, and a number of inventors, having
 improved apparatus and machinery for extracting
 and concentrating the juice, were present. From
 the conversations which took place at the convention
 we learn that there is quite a variety of sorghum and
 imphee. Mr. J. M. Moss, of Waverly, Iowa, related
 some very useful experience. He stated that there
 were five kinds of black imphee, one of sorghum and
 two of yellow imphee. The large yellow imphee
 ripens too late for seed, but in making sirup he
 knew no difference between the different kinds. After
 being made into sirup it all turns to sugar in eight
 months afterward. Out of a quantity of sirup from
 which 100 lbs. of sugar were obtained, there was only
 one pint of sirup left. He makes sugar simply by
 boiling down the sirup, and any process of evapora-
 tion which obviates scorching is suitable. After
 boiling down the sirup, he sets it away in a cool
 place and allows it to stand, stirring it about once
 per week, and without any other treatment it gradu-
 ally granulates and turns into sugar. It is a singu-
 lar fact that the sirup does not taste so pleasant
 during the period of changing to the granular state.
 Most of the 2,753 gallons of sirup which Mr. Moss
 had made in the Fall of 1862 has now become granu-
 lated, and he exhibited several samples of the sugar.
 In obtaining sirup the cane is first crushed between
 iron rollers and the juice transferred to evaporators
 to be concentrated. Mr. Cory, of Indiana, exhibited
 and explained his evaporator. He stated that the
 Chinese sugar cane was the best for sirup and sugar,
 and that Otaheitan seed was worth its weight in
 silver.

A committee appointed to examine and report on
 sugars and sirups stated that the samples were so
 very numerous that they could not designate any
 one as having a claim to superior excellence, but
 considerable improvement had been made during the
 past year in the manufacture generally. A committee
 appointed on seeds reported that opinions were so
 various that no definite conclusion could be arrived
 at respecting the best kind of seed, but the yellow
 imphee or African cane was the most suitable for ob-
 taining sugar, and that seed of a medium size, be-
 tween the largest and smallest varieties, appeared to
 be excellent. More experiments, however, were
 necessary to determine which was the best.

The conclusions arrived at from the proceedings of
 this convention are that the cultivation of the
 sorghum and imphee is a success in the great West,
 at least for the production of sirup for home use, but
 how far it will be practical to manufacture the sirup
 and sugar from it for sale and export remains to be
 determined. We believe it only wants perseverance
 to insure complete success.

Rainbows.

We recently received a letter from a correspondent
 in relation to primary and secondary rainbows, and
 we have since found the following facts upon this
 subject in the *Journal of Popular Sciences*:—

"There are frequently two rainbows seen, primary
 and secondary; the former is by far the brightest
 one, being formed by the rays of light falling on the
 upper part of the rain drops; for a ray of light, en-
 tering the upper part of a drop of water, will by re-
 fraction be thrown upon the inner part of the spheri-
 cal surface of that drop, where, undergoing a second
 refraction it will be sent toward the eye of the spec-
 tator. Since the rays which fall upon the primary
 bow come to the eye after two refractions and one re-
 flection, and the colors of this bow, reckoning out-
 ward, are violet, indigo, blue, green, yellow, orange
 and red. The secondary bow is formed by the rays
 of light falling on the lower part of the drops of rain.
 These rays, like the former, undergo two refractions,
 namely, when entering the drops of rain and when
 emerging from them in passing to the eye, but they
 suffer two or more reflections in the interior surface
 of the drops, hence the colors of their rays are not
 so strong or so well defined as those in the primary
 bow and appear in an inverted order."

Propositions to Supply the Navy Department.

The following propositions were received at the
 Navy Department during the week ending December
 13, 1862:—

Peck & Chase, New York, offer the steamer *Union*;
 price \$35,000.

Cyrus Moore, Washington, offers eight steam pro-
 pellers; price \$8,500 each.

Samuel Strong, Washington, offers *Broad's Patent*
Life-saving and Troop-landing Rafts, at \$800 each, pro-
 vided not less than fifty are ordered.

Copeland & Howe, New York, offer the steamer
Clifton at \$122,400, and the *Oneala* at \$57,400; also,
 to complete a steam-tug boat for \$41,850.

By the Bureau of Ordnance—Wm. Andrews &
 Brother, New York, offer some superior old English
 gun iron at \$45 per tun.

D. C. Sage, Middletown, Conn., offers to furnish
 cartridges at the following prices:—Pistol cartridges,
 with caps, in wood, \$13 per 1,000; without caps, in
 wood, \$11 per 1,000. Rifled muskets, with caps, in
 wood, \$23 per 1,000; without caps, in wood, \$21
 per 1,000; with caps, in paper, \$21 per 1,000; with-
 out caps, in paper, \$19 per 1,000.

Philip S. Justice offers to deliver in Liverpool gun-
 blocks, manufactured of homogeneous cast-steel, at
 £100 per tun.

J. J. Ashcroft & Co., Cincinnati, offer to make all
 sizes of cast-iron projectiles, from best charcoal iron,
 the ruling prices paid for them.

Novelty Works, Pittsburg, Pa., offer to manufac-
 ture shell and shot for the Government at the same
 prices others are paid.

E. D. Saxton and others propose to make arrange-
 ments with the Government for the manufacture of
 iron and steel in any quantities that may be desired,
 and at prices which shall be a great saving, after the
 improved smelting and refining process invented and
 patented by E. G. Pomery, of New York. To enable
 the parties to carry out their plans and establish the
 requisite means, the estimated cost of which will be
 \$100,000; to be applied and disbursed under the su-
 pervision of an agent of the Government, &c.

By the Bureau of Provisions and Clothing—J. H.
 Copeland, President of the American Desiccating Com-
 pany, offers to furnish desiccated potatoes during the
 ensuing year, at 13 cents per pound.

L. L. Anderson, Louisville, Ky., offers 100,000
 pounds of tobacco at 60 cents per pound.

H. Chamberlain offers to deliver at the Brooklyn
 navy yard 30,000 yards of standard blue flannel, at 65
 per yard.

The "Alabama" Again.

The Anglo-Confederate pirate, *Alabama*, has again
 signalized herself by capturing the California steam-
 ship *Ariel*. There was a file of 120 marines on board
 of the latter ship, who were paroled. The *Ariel* is an
 old, side-wheel vessel, built many years ago. She
 was at one time given up for lost, when in the trade
 between Liverpool and this port, having been un-
 heard of here for something like forty days. It was
 ascertained, however, that she had put into South-
 ampton on account of a broken shaft. She has a
 beam engine, with a cylinder 65 inches in diameter
 and twelve feet stroke. She is also slow in her move-
 ments, so that the *Alabama* need not brag much over
 this achievement. One of the express companies
 lost \$8,000; this, with the arms and ammunition on
 board, was the only reward the pirate obtained. We
 live in the hope that before many days we shall have
 the satisfaction of announcing that the steamer *Van-
 derbilt* has captured this rover, thus restoring confi-
 dence to those who "go down to the sea."

PAPER STOCK.—Since the publication of our article
 on the paper stock famine, we have received a great
 many letters from persons residing in the country,
 requesting us to either act for them in selling their
 old papers or direct them to some one who will buy.
 We cannot possibly attend to such business, and
 would advise all parties who have paper stock to
 sell to entrust it to their local merchants. The
 prices here are fluctuating and unsettled.

The literati of Russia are chiefly Germans; the
 mechanics and merchants, to a great extent, are
 English and French; the bravest of her officers have
 always been Poles, Cossacks and Britons.