will generate sufficient heat to raise the temperature of 8,080 pounds of water one degree of the centigrade scale; and, according to Andrews, it will heat 7,900 pounds one degree. Taking the smaller of these results, 7,900 pounds, and reducing it, we find that one pound of carbon will raise the temperrature of 14,220 pounds of water one degree of Fahrenheit's scale. Multiplying this by Joule's equivalent, 772, and we have 10,977,840 foot-pounds as the quantity of work which one pound of carbon will perform. If we suppose it burned at the rate of one pound per hour, by dividing the foot-pounds of work by 33,000 and by 60 we shall have the horse-power 5½. If all its heat could be utilized, therefore, we should have a horse power from $\frac{2}{11}$ths of a pound of coal per hour. This point is worth remembering—that theoretically we should have a horse-power from two-elevenths of a pound of coal per hour.

The very best engines give a horse-power from about two pounds of coal per hour, and it is a good engine that produces a horse-power from four pounds of coal per hour. An engine that gives a horse-power with two pounds of coal per hour utilizes in work about nine per cent of the whole power of the coal; and one that yields a horse-power for four pounds of coal per hour, utilizes about four and a half per cent of the power of the coal.—*Scientific American*

Fare Indicator for Hacks.

An ingenious little machine has been put on some of the Parisian hacks. It indicates to the passenger who engages it, at once the time he is riding, the distance he has made, and the price he has to pay, according to the official regulations.

Breaking up Large Castings.

Mons. Le Gugenheim has communicated to *Les Mondes* a simple and ingenious method of breaking up large masses of cast-iron. He drills a hole about a third through, fills it with water, inserts a steel plug, and strikes the plug with a steam hammer, or any other means to give a powerful blow. The mass is generally split at one blow.

It appears to us that this process may be applied to split stones. Drill a row of holes, fill them with water, drive into them plugs, which have pipes through them, and are connected with a hydraulic press. Strike the same as directed by Mons. Gugenheim. The force of the blow will be diffused through all the holes; and, if the holes be properly situated, the split will be more accurate than is attained by common methods. The advantage will be that the force is applied at the same instant throughout the pipes and holes.—*American Artisan.*

Beet-Root Sugar in France.

We have before us the official returns relative to the manufacture of beet-root sugar down to the end of February. The sugar makers have had a magnificant campaign, as the season is called in France, the roots which yield on the average 5 or 5½ per cent. of their weight in sugar gave this year, in many instances, 7½ per cent. of crystallized sugar; this is partly owing to the beet-root itself, and partly to the improvements which have been made in the modes of manufacture which enable the sugar maker to save more from the molasses.

The increase, as compared with the previous season, is most extraordinary; the total quantity produced to the end of February was 242,114 tons against 141,802 tons in 1864-5, an excess of more than a hundred thousand tons, or about 70 per cent. To this will have to be added the produce of the month of March, not yet published; but as the quantity of sugar and molasses in the course of manufacture at the end of February was upwards of twenty thousand tons, there is no doubt that the total make of the season will exceed 250,000 tons. It appears that there were twenty-one more sugar houses at work during the campaign now just concluded than in the preceding season. The stock in hand at the commencement was less by about 2500 tons in the former than in the latter case; the home consumption has been larger by 50 per cent.; the distilleries took nearly twice as much as during the preceding season; and the exports, which were 1598 tons in 1864-5, rose to 35,948 in 1865-6. The stock in hand is 64,314 tons against 30,920 on the 28th February, 1865.

Such extraordinary figures would revolutionise many trades, but the demand for sugar is so large and so general that the world seems ready to take all that can be produced, and England is one of the most urgent customers. It is well to add that it is now confidently stated in well-informed quarters in Paris that still greater improvements in sugar making are likely next season still further to increase the yield in sugar and to diminish the quantity of molasses, it which case it is thought that a large mass of inferior beets, which cost too much to convert into sugar, will be left to the distillers. This will have the tendency to bring down the price of raw sugar to a certain extent, especially if the manufacture continues to develope itself.—*The Grocer*

Safety Apparatus for Steam Boilers.

The invention of Mr. J. M. Courtauld, of Brocking, consists in the employment of a copper or other suitable metal tube, carried through the upper part of the boiler, and descending below the proper working level therein, and in connecting to the upper part of the tube carried to a greater or lesser height from the top of the boiler a rod, which, by the expansion of the tube, acts upon a safety valve, when the water falls below the proper level, and allows steam to escape from the boiler.—*Mining Journal.*

[This gage is an American invention and has been in use in this country for some time. It is owned by Messrs. Carpenter & Van Riper. It works satisfactorily. Eds.—*Scientific American.*

French Glove Manufactures.

It is estimated that the value of the gloves manufactured in France is between $8,000,000 and $10,000,000, and is still rapidly increasing. The kid and lamb skins used for glazed gloves are dressed at Paris, Grenoble, Annonay, Romans, and Charmont. The Paris manufacturers, whose gloves are most highly esteemed, employ workmen from Vendome.