

which is substituted, as referred to in a previous article of this series, is air previously heated in an oven to a high degree of temperature, in some cases several thousand degrees Fahrenheit, whence it is blown into the furnace, causing a prodigious increase of combustive power.

As it is our intention in these articles to make the subject of iron manufacture of interest to the general reader who is generally repelled by its complexity and its technicalities, the informed reader will perceive why we must enter into an occasional minuteness of detail that may to him seem unnecessary. On looking over a price list we meet, beside the various qualities of pig-iron and wrought, another state known as puddled iron. This is half manufactured iron. If pig-iron is compared to flour, wrought iron will represent the loaf and puddled iron the dough. We do not enter here into any description of what are known as malleable castings made from charcoal pig-iron, the quality chiefly prepared by the St. Maurice Forges.

Pig-iron is classified according to its uses. The two great divisions are,—for "foundry purposes" and for "forge purposes," a diversity partly caused by the different property of the ores, but mainly by the difference of the fuel and of the treatment. The fluid iron needed for the foundry is produced by increasing the proportion of the fuel to the mineral, and thus impregnating the product with a greater proportion of carbon, and which is therefore more costly to make and more expensive. What is called "cinder iron" is the refuse of the puddling furnace, containing a considerable percentage of iron in combination with the impurities expelled from the pig iron in the process of puddling. This power of the hot blast in extracting this iron is equivalent to the discovery of a new iron stone supplied for nothing; but the produce is much deteriorated by the ingredient. "All mine" is a term used to denote that no such deleterious admixture has been employed. "Red short," and "cold short" are terms used to indicate the quality of being brittle when red hot or cold respectively.

The qualities of pig-iron are various, and denote not merely degrees of goodness but totally different properties; they are usually designated by the numerals up to 8; numbers 1, 2 and 3 mark the gradations of the grey "melting" iron, which is used chiefly for very fine castings and steel. No. 4 is generally called "best grey forge," but is too grey for ordinary forge purposes. No. 5 is called "grey forge," and is less melting but of tougher quality. No.

6 is "strong forge;" these two latter qualities are those in greatest request for the manufacture of wrought iron. No. 7 is mottled, and No. 8 is white. The latter are of decidedly inferior quality, but useful for many purposes. Melting iron may at once be distinguished by the novice from the tougher kinds by its grey color and the sparkling crystals it exhibits where broken, but it requires the eye of an adept to distinguish No. 1 "all mine" from No. 1 "cinder iron."

Much depends upon the skill of the manufacturer in producing good qualities of iron, even with the best materials and appliances, and in spite of the best skill and care a certain proportion of inferior qualities will be turned out. Above all, success depends on the judgment with which the materials are combined; the proportion of flux must vary according to the character of the ores, but though this may be learned empirically by a clever and observant furnace manager, the result would be arrived at with more speed and certainty by the assistance of chemical analysis.

The 33,300 tons of pig-iron imported by us from Great Britain in 1880 may be estimated worth about 7 millions of dollars. The greater part of this was undoubtedly made from ores of a quality far inferior to those of Hull, Madoc and other places in Canada which are anxiously waiting the establishment of local smelting furnaces, whether by the Duryee petroleum process or some other method. The great impetus given to railway enterprises of late should stimulate our people to renewed efforts at utilizing our own abundant and superior raw materials and thereby attracting to Canada that skilled labor which we now indirectly employ in other countries. The total imports of iron and steel of all kinds from Great Britain to Canada during the period aforementioned was nearly 200,000 tons. The highest in any previous year was 258,743 tons, viz., in 1872.

COMMERCIAL RELATIONS WITH FRANCE.

FRANCE ADMITS UNITED STATES EXPORTS AT MUCH LOWER DUTIES THAN THOSE FROM CANADA; CANADA ADMITS FRENCH EXPORTS ON MUCH MORE FAVORABLE TERMS THAN THE UNITED STATES DOES.

Is *La Minerve* to be congratulated or not on its success in finding a champion to defend the treatment of Canada by France? There is something to be said on both sides of the question. It may certainly be in some degree satisfactory to be relieved of the task of defending an untenable position, but when it is con-

sidered that the selected champion is Mr. J. X. Perrault, the avowed advocate of revolution, it cannot but be humiliating to the organ of the loyal portion of the French Canadians to be compelled to accept such aid. Those who have witnessed Mr. J. X. Perrault's recent escapades, will not be surprised to find him taking part with France against Canada and Great Britain. It seems far from improbable that in advocating independence, or, in other words, endeavoring to effect a separation from Great Britain, he may have an ulterior object in view, and may imagine that it would be possible to bring about more intimate relations between the French Republic and "ses anciens colons." It is a significant fact that the rejected of East Montreal has been selected as a Vice-President of the Committee of Reception of the "distinguished citizens of La Belle France," who have been invited to visit Canada. Possibly Mr. J. X. Perrault may be more consistent in his conduct on the occasion than some of his associates.

We must however proceed to notice Mr. J. X. Perrault's letter to *La Minerve*, and we are bound to acknowledge frankly that he has raised a square issue, and, moreover, that he is quite consistent with his previous declarations. He commences by congratulating *La Minerve* on the energetic position which it has taken in affirming our "absolute right to regulate ourselves, our commercial relations with foreign countries and especially with France!!! " "There is," he adds, "but one opinion in favor of this policy in the Province of Quebec." The obvious inference would be that the people of the Province of Quebec—or perhaps Mr. J. X. Perrault would limit his assertion to those of them who are French Canadians—concur with him in his opinion that Canada should separate from Great Britain. We have demonstrated more than once that Mr. Perrault and those who share his views are unable to establish any real grievance as to our foreign relations. *La Minerve* is well aware that the leader of the Dominion Government disclaimed altogether the responsibility of the irregular negotiations which were said to have been carried on by Sir Hector Langevin, although it has never been clearly established that that gentleman intended to enter into an unauthorized diplomatic correspondence. Mr. Perrault has made some rather rash assertions, one that for some months the name of Sir Alexander Galt was unknown at the French Bureau of Commerce. The object is to mislead, by conveying the impression that after Sir Alexander Galt visited Paris, with the view of entering into negotiations with the French Govern-