

and generally allows so much in the shilling out of his earnings to his employer, while acquiring the necessary skill to follow his business.

A freeman, skilled in printing and competent in color-mixing, is placed in each workshop to overlook the workers, and take entire charge of this branch of decorating.

The potter's printing press, in present use, is a lever cylinder, covered with thick flannel, with a movable table underneath. It is very much in the same form as the old lever type press.

Landscapes, figures, floral designs, and other patterns for embellishing, are engraved upon copper-plates by competent engravers.

The implements and other necessities, requisite for practical printing are—one hog-hair brush, one large palette knife, one large iron palette, one large wooden "dabber," one "boss" or "bat," made of corduroy, engraved copper-plates, a large, square, flat-topped stove, a printer's press, a quantity of printer's tissue-paper to take the prints or transfers on, an a jar of size.

The printer, when at work, stands facing the front of his press, with his right hand to his stove and his left hand to his table, or "bench." He commences work by damping with a brush, dipped in size, the top sheet of a pile of tissue paper placed upon the bench. The size is composed of soft soap and common soda, and it is used to prevent the color adhering too closely to the paper, allowing the print to leave the paper more readily when applied to the article that is to be embellished, and at the same time it prevents the paper sticking too firmly to the ware when in the "biscuit."

The printer next lays the copper-plate that he is about to take an impression from upon the top of the stove to get warm; this is done for the purpose of increasing the fluidity of the boiled linseed oil with which the color is mixed, and so enable the color to enter into the fine lines on the copper-plate more freely. After warming the copper-plate, the printer places some of the color upon it, carefully spreading the color over the plate with the wooden "dabber," then with the large palette knife he dextrously scrapes away all superfluous color. He next "bosses" or "bats" the plate clean with the "boss" or "bat," made of corduroy. This done, he takes a sheet of the sized tissue paper, and laying it evenly over the surface of the copper-plates, passes the plate, thus prepared, under the press. To remove the paper impression from the copper-plate, he first breathes upon the paper, and then gently loosening the corners, lifts it from the plate. The print is now ready for the "cutter."

After using, the copper-plates are thoroughly cleaned with spirits of tar and placed into a box containing sawdust, and there left until required again.

The old French method of printing was to cast a sheet of glue, a quarter of an inch thick, diluted, while warm, to such a consistence that, when cool, it was perfectly flexible, and pliable as leather. The impression was first taken from the copper plate upon this sheet of glue, and then transferred to the article requiring decorating. The glue could be applied two or three times before taking a fresh impression

from the plate. This printing was all done by hand.

Black printing, in the Potteries, was, at one time, done by a similar process, the gelatine bats being cast upon dish-bottoms, and then cut to the size required for the patterns. But this printing from bats has now fallen into disuse. Printing in gold has engaged the attention of manufacturers for some time past, and some of them have been so far successful, that they have considered it necessary to take out patents to protect their process.

The gold is used in the form of a powder in one of the processes, the pattern being first printed on the ware in a kind of preparation, and then, while the preparation is moist, the gold is dusted over it. The application of the photographic art to the embellishment of china and earthenware is fairly successful, but, as yet wants perfecting.—*Potter's Gazette.*

Coal in the Far North-west.

There are coal beds in various points in the North-west of the United States, and also in the British possessions, which are believed sufficient to supply the millions soon to be found there, for centuries. One portion of the territory partially examined forms the south-western angle of the North-west territory, and is drained chiefly by the Bow and Belly rivers and their tributaries, though a portion of it lies in the Missouri Basin, and is drained by the Milk River. It embraces about 20,000 square miles, and extends from the 111th meridian westward to the Rocky Mountains, being bounded on the south by the international boundary line, and on the north by the 51st parallel of north latitude.

The different kinds of coal vary from lignites "to materials containing a very small per cent. of water, forming a very strong coke on heating, yielding abundance of highly luminous hydrocarbons, and precisely resembling the ordinary bituminous coals, though of cretaceous or laramie age." They are slightly superior to those of the Souris region. Many of the seams are thin, and successive layers are divided by shales and other materials. Four or five layers so interstratified are not infrequent. Several of the seams are less than a foot in thickness; two are four feet eight inches thick, at the mouth of the St. Mary River there is one having a thickness of three and a half feet. Seams of about eighteen inches thickness are frequent, others are of various lower sizes, intermediate between those mentioned. The total varies from 9,000,000 of tons to 4,900,000 the square mile.

How far the coal deposits will be found to extend it is too soon yet to estimate, but from east to west they are found in places 500 miles apart, and from north to south they are never over 250 miles apart.

Grain Handling at Montreal and New York.

The *Millers Journal* of New York publishes an article on the comparative charges for handling grain at these two ports, from which we take the following:

"Chicago and Montreal, we notice, are watching with keen interest the action of our

State Legislature upon the pending bill to reduce the cost of grain elevating at this port. The latter, naturally, is in favor of the charges remaining at the present high-water mark, as the effect must be to divert trade to that port; while the former, with an intelligent sense of self-interest, it is certain, stands ready to patronize the port which promises to do the work for the least money. The *Chicago Tribune* is warning New York not to be so unwise as to play into the hands of the Canadians, and supplements the warning with a recapitulation of the comparative cost of doing business at New York and Montreal that tells anything but to our advantage. Thus, the charges for handling and transferring 1,000 bushels at present rule as follows: In Buffalo, \$15.25 for trimming, elevating and cleaning, and in New York \$19.50 for the same work. Add to these charges \$2 for the scaler's fee in Buffalo, and the total expense of handling the grain in the two cities is \$36.75. It is alleged that the actual cost of doing the work in the two cities is less than \$10, which gives the elevators and their associates in the business a profit of about \$26 on every 1,000 bushels handled. On the other hand, the total charges on grain shipped to Europe via the Welland Canal, requiring only one transfer at Montreal, are stated to be \$9 per 1,000 bushels, which includes trimming in, trimming out, and elevating. This makes a difference of \$27.85 in favor of the Montreal route, or 27 cents per bushel less by the Canadian canal than by the way of the Erie Canal to New York. The rates under the bill pending in Albany will be as follows per 1,000 bushels: For transferring at Buffalo, \$10.25; for elevating, weighing, cleaning, and delivering at New York, \$14.40; total, \$24.75, which is still \$15.75 more than the same charges by the Canadian route.

An exchange, in discussing English and American railways, finds that the percentage of earnings to capital in the United Kingdom and the United States has a different meaning, for the reason that railroads in Great Britain "are not mortgaged so heavily" as those in this country. The average net earnings of the English roads in 1880 were 4.72 per cent. on the total capital, while in that year in the United States the average was 4.19 per cent., and the dividends on the former were 4.72 per cent., against an average of 4.50 per cent. for the roads of this country. That is to say, the railroad capital of the United States is nearly equally divided between mortgages, bond, and share capital, "the former paying an average of about 6 per cent, and the latter about 3 per cent." The English roads report an average cost of about \$196,500 per mile, and roads here a capital average about \$60,500 per mile. The average working expenses of the English roads are less than the American, the proportion of expenses to receipts being, British, 51.6 per cent., and American, 60 per cent. The average gross income per mile in 1880 was about \$7,000 on the British lines, and on the American lines about \$5,500.

The first vessel leaves Covingwood for Duluth this week, and thus opens navigation on Lake Superior.