

of blackbirds, as they call them, come and go, never saw such a thing as a white one before. The appearance of this anomalous bird, as he arose and settled amid his companions of a darker hue, was very striking, they seeming to care no more for him than if he were one of their own color.

BIRD LOVER.

[Rev. A. H. Gesner, of Sing Sing, N. Y., states that he had this bird in his hand.—Eds.]

LETTER FROM UNITED STATES COMMISSIONER  
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LIEGE,

Belgium, and the surrounding country is by far the busiest district that we have yet visited on the continent. The city is quite large, having a population of about 120,000, and has been called

THE BIRMINGHAM OF BELGIUM.

En route to Brussels, our road took us through a wonderfully active country, and we were continually called to look at the smoky, clustering villages, situated in pleasant and romantic spots among the hills, blots upon beautiful landscapes; yet such defects have made this little domain the most successful and prosperous portion of Europe.

The manufacturers of Belgium have a history dating back as far as the Roman occupation of Northwestern Europe at the commencement of the Christian era. The energy and courage, which then won from the great Cæsar a respect which was accorded to few other tribes, has never been lost, and has developed itself splendidly in gaining victories of peace. The character of the work done in Belgium is better, as a rule, than is found in any other country of Europe, and is second only to that done in England. In some cases, Belgian manufacturers of machinery have even successfully competed in England with British builders. The country produces its own flax, and textiles are produced from it of the best quality. Cotton and wool are largely imported, and, in some branches, the manufactures of these staples are carried on with greater success than in any other part of the world. The best machinery, however, is usually purchased in England, and the superintendents of mills are frequently imported. The manufactures in iron have an antiquity which antedates history. The Romans are supposed to have found rude forges and furnaces in operation, and vast cinder heaps are found here and there which testify to the extent, as well as the early date, of the transition in Belgium from the age of stone and brass to that of iron; and the method of working has been learned also by the discovery, at Lustin, about three years ago, of two

ANCIENT SMELTING FURNACES,

with their contents just as they were when they went out of blast two thousand years ago. They were merely excavations in the clay, oval in form, some twelve feet long and a yard in depth. No artificial blast was used, but a long channel, opening toward the quarter from whence blew the strongest winds, served to direct the air supply into the lower part of the furnaces. The result was the reduction of the ore without carbonization, the product being a crude sort of wrought iron. The iron, found in the furnaces just referred to, contained nearly 95 per cent of pure iron, the remainder consisting of a variety of generally injurious impurities.

From that time to the present, the Flemings have never lost their skill as workers in iron, and they have succeeded well in keeping pace with the progress of improvement. To-day, we are told that Liège possesses 98 iron works, turning out, in 1872, 178,000 tons of pig metal and 103,000 tons of finished iron. Charleroi threw into market 400,000 tons of pig and 250,000 tons of manufactured iron. Verviers, where was built the Thompson road locomotive exhibited at Vienna by Bede & Co., Seraing, where is the establishment of the Cockerill company, Ghent, Brussels and Antwerp and many other towns are well worth visiting, but we had not time to explore other cells of this busy hive of the Flamands.

Had the Belgians the steadiness and persistence of the English workman, or the energy and activity of the American, this little kingdom would become a most formidable industrial rival to all its neighbors. As it is, the people have nobly illustrated their national motto "*L'Union fait la Force*," and by industry and frugality, and by close attention to their pursuits, whether of commerce or of manufactures, have converted their once unproductive fields into a vast and beautiful garden, have turned their mineral resources into national wealth, and have built up beautiful towns and magnificent cities in every district of their State. The whole country has an area of but eleven thousand square miles, just the area of the State of Maryland; yet Flanders produces eight millions of dollars worth of flax, Hainault raises two millions of tons of coal, and cotton manufacturing employs some fifteen millions of dollars of capital. Brussels and Mechlin lace, Ghent calicoes, Tournay carpets, the paper and the firearms of Liège, and the more important branches of iron working already considered, have been as useful in stimulating commerce as in directly contributing to the national prosperity.

The work people are not usually as well provided with the comforts and conveniences of life as they should be, but instances are not infrequent of employers making special provision for their welfare in a degree which is not actually incumbent upon them. I am very confident, however, that in no instance, at home or abroad, does the employer fail ultimately to receive a bountiful return for all capital expended in providing for the physical, intellectual and

moral welfare of his employees. Physical benefits conferred bring back a return in healthful energy, intellectual training gives intelligence which invariably finds application, and moral advancement results in an increased sense of responsibility; and all together promote wonderfully that appreciation of the mutual obligations binding master and man which is the best of all preventives of strikes and lock-outs, and of all those unfortunate disagreements which divert the trades unions from their legitimate work and bring embarrassment and distress upon all classes. The Messrs. D'Andrimont have erected, at their collieries at Micheraux, the

HOTEL LOUISE

for their work people. The house contains 200 beds, the rooms are fitted up plainly but neatly, with all modern conveniences, and the prices charged are as slight an advance upon cost as will secure the proprietors against absolute loss. Each man pays about a franc and a half (thirty cents) per day for lodging, meals, washing and necessary attendance. A miner, returning from work, goes to the lavatory, removes his begrimed suit of clothes, sends them down by a "dumb waiter" to the laundry, takes his bath, receives a clean suit of his own clothes in return for those sent down, and makes his appearance ready for his meal, or for cleanly occupation during his "off watch," dressed very like a gentleman, and, with his neat suit and freshly blacked boots, experiences a feeling of self respect rarely known under the ordinary régime of less well administered coal mines.

Here the maximum earnings of a miner are given as about ninety francs (eighteen dollars) in a month, one half of which might have been saved by a frugal single man. In the

COTTON AND WOOLEN MILLS,

as well as in many other branches of industry, the work people labor generally seventy-two hours per week, and no abatement of time is made for women and children, in which classes thirty-five per cent and twenty-five per cent, respectively, of the working population are included. In some cases, the working hours have been reduced to ten, and that without decrease of production. The amount of work done by each hand probably averages less than with us, although the speeds of machinery are about up to our standard. Thus, cotton looms run 125 to 180 picks per minute, woolen 140 or 150, and sometimes at higher speeds. Cotton spindles are driven up to 6,000 revolutions on American and 5,000 on East Indian cotton, woolen spindles make 5,000 or 5,500, and flax spindles 3,500 turns per minute. The number of operatives varies from seven to ten per thousand spindles, a number exceeding the figures of our own and English mills. Some of these mills contain 200,000 spindles, and the tendency is, as with us, continually toward increasing the size of mills, and securing the increase of economy which is a usual consequence of enlarged production. That sound business policy which dictates the purchase of the best possible machinery is also well understood there, and the less frequently acknowledged principle that prosperity always ultimately attends honest work and liberal dealing is, perhaps, more generally recognized than among many other manufacturing peoples.

A pleasant afternoon ride from Liège through a very busy country, during which we were rarely beyond the sound of the armorer's hammer or the hum of spindles, was terminated, toward evening, by our arrival in

BRUSSELS,

a favorite city with travelers, who can usually second the encomiums of Byron, of Scott and of Southey, who were enthusiastic in their admiration.

We had but little time to spare, and could not even find opportunity to call upon our distinguished friend and colleague, M. Le Professeur Lambert, who, some years ago, so intelligently examined the resources and studied the industries of the United States, under the direction of his government. We were more fortunate in the attempt to meet the "friend of excursionists," Mr. Cook, from whom we learned that the party of circumnavigators of the world, who are to trust their fortunes in the hands of his guides, is composed principally of Americans. "*Natürlich*," his German assistant remarked, and the French attendant added: "*parfaitement*." Brussels is indeed a noble city, and we regretted very much that we had not time to explore it more thoroughly, and especially to visit the galleries of paintings for which it is famous, and in which so many of our artists find instruction and inspiration. However, as an uncultivated taste has caused me to prefer the paintings of Titian to those of Rubens, and the masterpieces of Correggio to the *chefs d'œuvre* of Raffaele, this disappointment may have been, in some degree, deserved.

The pleasant streets, the noble old cathedral, the beautiful Hotel de Ville with its odd sculptures and tall, graceful spire, and the magnificent, but still unfinished, Bourse, which we thought the noblest modern structure which we had yet seen in Europe, all delighted us, and we came away most reluctantly, but with the hope that we may see more of this "junior Paris" at some future time.

We left Brussels by the evening express train and arrived here early next morning. We had not a comfortable ride, for the French railway carriages are not as comfortably cushioned nor as nicely upholstered as those of Germany and Austria. They were in this train nearly as meanly fitted up as the general run of English cars. Reaching Paris at an early hour this morning, we enjoyed greatly the ride to our hotel through the clean streets, already enlivened by crowds of working people on their way to commence their tasks, the clear fresh air giving every one a cheerful humor and a brisk manner that was quite inspiring.

During the short period of our stop here, we have had opportunities of visiting the more interesting portions of the

city and of inspecting the principal edifices. We have visited

NOTRE DAME,

and have admired its architecture and wondered at the strange taste which could have placed above its galleries and on the towers the ugly carved monsters which were probably once supposed to add to the beauty of the venerable pile. In their presence, it is easy to imagine Quasimodo. We have looked upon the tomb of Napoleon Bonaparte, at the Invalides, and, with less of interest, perhaps, but with greater pleasure, have explored the Panthéon, where lesser heroes but greater men are interred. We have admired the Madeleine and the beautiful little Sainte Chapelle, and have viewed the new Opera House from every accessible standpoint. We have enjoyed the "*Concerts des Ambassadeurs*" in the Elysian Fields and have stood in half pleased, half sad admiration within the structure which contains the beautifully executed and wonderfully well designed panorama of Paris during the siege. The spectator is almost convinced as he gazes upon this splendid picture, that he is actually upon the battle field before Paris, so perfectly do the art of the painter and the scenic arrangement combine to deceive him. We have been courteously received at the Ecole des Mines and at the Ponts et Chaussées, and have examined their collections and studied their methods, and have been, in defiance of regulation, shown through the rough looking halls, lecture rooms and dormitories of the famous Polytechnic School, from which have graduated the greatest engineers, both civil and military, that modern France has produced. We have seen the Institute, the home of the French savans, and have looked upon those sad reminders of the existence of the commune and the falsity of the authors of the legend, everywhere seen, "*Liberté, Egalité, Fraternité*," the ruins of the Hotel de Ville, the Louvre, and the Colonne Vendôme.

We have visited that wonderful depository of ancient industrial relics and of the marvels of modern invention and art the

CONSERVATOIRE DES ARTS ET METIERS.

Here we spent a large part of a day, meeting General Morin and M. Tresca, the distinguished *Directeur* and *Sous Directeur*; and, by the kind attention of the son of the latter, we succeeded in making a very thorough exploration of this world renowned institution and of its unequalled collections in every department of human industry. The old looms of Vaucanson and of Jacquard are preserved here in the *Salle des Filatures*, in the midst of a multitude of models and machines belonging to the department of textile industry, and are guarded with jealous care as most precious relics. A long gallery is filled with machinery and models of various sorts of machinery, including beautiful models of steam engines, which have cost, in some cases, several thousand dollars. In the chapel, for this was formerly the monastery of St. Martin des Champs, are steam engines of large size, steam fire engines, turbine water wheels, all sorts of apparatus for testing the efficiency of machinery, and large models driven by steam power. In this hall is the first steam carriage ever constructed, that of Cugnot, which was built in 1769. This was before the introduction of the crank, and the engine has a ratchet-like arrangement by which it turns the wheels. For so old a construction, the work seems surprisingly well done, and the proportions are also good. It is an exceedingly interesting machine. We may hope, but can hardly expect, that some future day may see such a splendid collection in our own country. At present nothing approaching this in extent or completeness exists in any other city in the world.

R. H. T.

A Compound Locomotive.

An ingenious member of the Manchester Scientific and Mechanical Society proposes to apply the compound principle to locomotives. This is how he sets about it, says the *English Mechanic*. He would use steam of 250 lbs. on the square inch to work the small cylinder, and expand this steam into a supplementary boiler bearing a pressure of 60 or 65 lbs. to the square inch, so as to have a surplus of effective pressure of 180 lbs. or 190 lbs. in the small cylinder, or about 60 or 65 lbs. in the larger one. The principal alterations proposed are in the boiler. In adapting his plan to a locomotive of the medium size, he would make the boiler 2 feet longer than at present, and divide it into two distinct parts, the part containing the furnace or fire box to be 2 feet shorter than at present, so as to have the supplementary boiler 4 feet longer, both being equal in diameter, and equal in number, size, and position of tubes, the two parts of the boiler being firmly bolted together, and so arranged that the tubes of one are in a line with the other, so that the hot air and flame may pass freely through from one to the other. An important advantage claimed by the plan is that the driver of the locomotive will be enabled to start his engine with the full power of steam in both cylinders at once, which he could not do if compounded in the usual way. Although this plan will require extra outlay, there will be a considerable saving in fuel, which, with other advantages, it is claimed, will more than compensate for the extra cost. We are not surprised to hear that discussion followed the reading of the paper, in which the feasibility of the plan was generally condemned. Ultimately, however, the discussion was adjourned, in order that the inventor might give further information on the subject.

J. W. S. writes to say that he has a perpetual motion in running order, and he will dispose of it for \$2,000,000 for a "plot," but if he has to carry it to Washington, he will ask \$5,000,000. The existing financial crisis will, we fear, prevent our correspondent from receiving either of the sums he mentions.