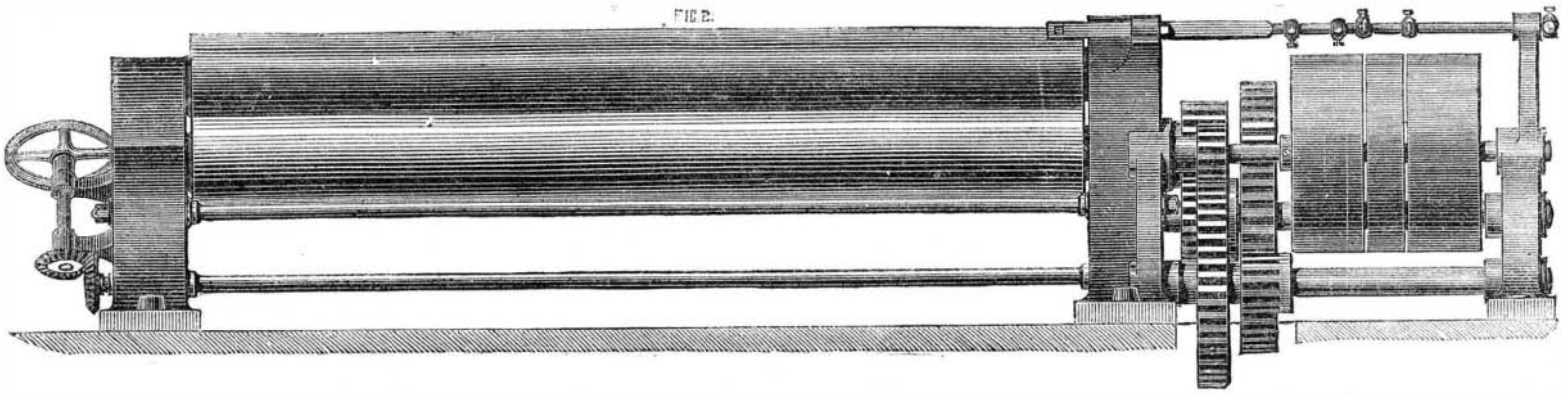
NOTES FROM THE VIENNA EXPOSITION.

RIGHTS OF WOMEN IN VIENNA.

A correspondent of the *Baltimore American*, who is in attendance at the exhibition, speaks of an immense building, occupying a whole block, in course of erection in Vienna, on which not less than 400 persons are employed, fully 200 of whom are women. All the hard laboring work is done by women, such as making and carrying mortar in buckets on their heads to the workmen, and handling the brick. They are not allowed a moment's leisure, several overseers being on guard to keep them constantly in motion. "We found the same proportion of women at work on all the new buildings, and there must be many thousands of them today doing this species of laboring work in Vienna. There are young, middle aged, and old women, but all seem to be strong and healthy. At dinner time they swarm into the shops to purchase a piece of brown bread, and eat their dinners sitting on the curb-stones. The wages are one florin, or forty-eight cents per day, and I am assured by a gentleman resident here that most of them sleep about the building on shavings, or in barns or sheds, having no homes. It is not to be wondered at that, of the 8,000 births annually in the lying-in hospitals of Vienna, less than 500 are of children born in wedlock."

PLATE BENDING ROLLS.

Among the metal working appliances is found a plate bending machine, shown, by the *Chemnitz Werkzeug Maschinen-Fabrik*, of which we give an illustration selected from



Engineering. The rolls are 7 feet 4·58 inches long and 9·84 inches in diameter; and the pulleys are arranged so as to drive, through double gear, backwards and forwards. The uppermost roller is raised by a very ingenious arrangement. The hand wheel, shown in both views of our engraving, communicates motion through a pair of bevel wheels to a horizontal spindle traversing the whole length of the rolls. This spindle has two worms on it which give motion to the worm wheels, one of which is seen in the end view on the outside of two columns lying underneath the gudgeons of the roller. The rotation of the worm wheels raises the roller (shown in its lowest position in the engraving) by means of internal screws. The machine, the workmanship of which has been highly spoken of by some cotemporaries, is intended to bend plates up to three fourths of an inch in thickness.

POTASH SALT.

The mines from which this product is obtained are very valuable, since there is no competition in the market. There are only two of these mines, one of which is in Germany, at Leopoldshall and Stassfurt, and the other in Austria, at Kalusz. Mr. Kustel writes, to the *Mining and Scientific Press*, from Vienna, that a very complete exhibition of potash and its productions can be seen at the Vienna Exposition. He says, in referring to the mines mentioned above, that it is the belief that these potash deposits are the result of the evaporation of former remainders of large seas, concentrated in a few favorable localities. The formation of these deposits, under such peculiar and lucky circumstances, indicates that little prospect for new discoveries exist in this line, but it is not impossible that such deposits may be found in the United States, in districts where salt rock is known to exist. Although the potash was known and used in many branches of industry long ago, its large and extensive application in practical life is not older than the discovery of the Stassfurt deposit (twelve or fifteen years ago). Formerly, the potash salt that covered the salt rock bed was considered a nuisance; it was not utilized; its value not known; and now, not the immense bed of salt rock, but the above nuisance is considered the wealth of Stassfurt. Eight millions of thalers were offered for that part of the deposit which is in Stassfurt, but the offer was not accepted. The total extraction of this salt in 1872, at Stassfurt and Leopoldshall, was eleven millions of hundredweights. This shows what extensive use is made of this article in agriculture and trade.

A LARGE LOCOMOTIVE.

The new Belgian exhibit, says *Engineering*, is by far the largest locomotive in the collection at Vienna, it being an engine on Meyer's system, having two steam bogies, each with a pair of cylinders 17$\frac{5}{16}$ inches diameter and 1 foot 7$\frac{1}{16}$ inches stroke. Each bogie has six coupled wheels, 4 feet in diameter, placed with a wheel base of 8 feet 8$\frac{3}{16}$ inches, the total wheel base of the engine being 28 feet 7$\frac{3}{4}$ inches. The boiler has a barrel of 4 feet 11 inches in diameter outside, and contains 289 tubes, 1$\frac{3}{32}$ inches diameter outside and 14 feet 9$\frac{1}{8}$ inches long between tube plates, these tubes giving an external heating surface of 2199 square feet. The fire-box surface is 128$\frac{1}{4}$ square feet, making 2327$\frac{1}{2}$ square feet of heating surface in all, while the firegrate area is 33·6 square feet. The tanks carry 1760 gallons of water, and the weight of the engine is 55 tuns empty, or 71 tuns in working order. This engine is intended for service on the Grand Central Railway of Belgium, and it is exhibited by the maker, M. Charles Evrard, of Brussels, who has materially improved MM. Meyer's original design.

RUSSIAN MALACHITE.

The malachite work is perhaps the most beautiful of anything that is peculiarly Russian in the exhibition. No one who has only seen this stone, says the New York *Tribune* correspondent, with its graceful veinings and mottlings of dark and light green, in small pieces in jewelry, can realize its beauty when used in combination with gilt in large vases, clocks, and for the tops of tables. The finest marbles or even jasper do not compare with it. The Russians alone possess the stone; but in its cutting they develope nothing original, and only copy French and Italian forms.

RUSSIAN WAR MATERIALS.

The Russian Government makes a complete exhibit of her weapons of war, and, so to speak, shows her teeth to the world. Here are specimens of shot and shell, field artillery and mitrailleuses,

GATLING GUNS,

and American racks of breech loading small arms (Berdan's system, an American invention), cartridges and cartridge machines, tents, ambulances, accoutrements of all kinds,

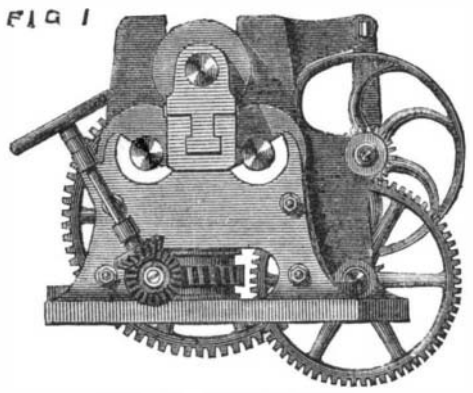


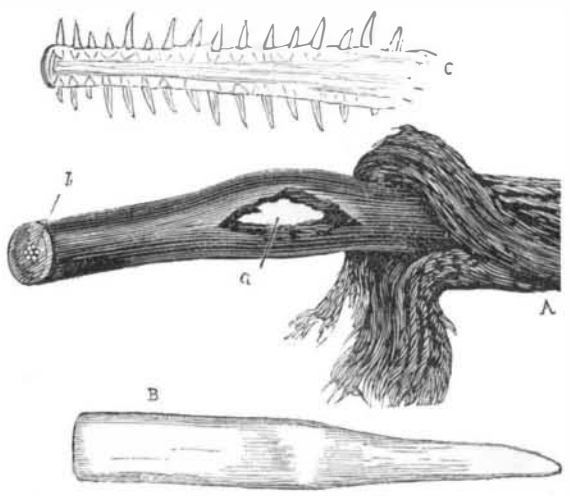
PLATE BENDING MACHINE.

uniforms, models of navy yards and iron clads—in a word, all the paraphernalia of war by sea and land.

A Sawfish Cuts a Telegraph Cable.

In the SCIENTIFIC AMERICAN of February 17, 1872, we gave some account of the injury to the telegraph cable between Florida and Cuba, from the bites of sea turtles or other fish; and also of injuries to cables submerged in the China Sea, occasioned by the attacks of marine insects. Another enemy to telegraph cables has made its appearance in the shape of the sawfish, who has been guilty of using his teeth upon the Singapore and Penang cable, and thereby suspending telegraphic communication. Mr. Frank Buckland, in a recent number of *Land and Water*, gives the following interesting account and engraving:

The drawing is made the actual size of the injured portion of the cable. A hempen rope, A, is tightly coiled round the gutta percha portion of the cable. This was, of course, underneath the iron wires which formed the outside of the cable. In the middle of the gutta percha the copper wires are seen embedded at *b*. In the middle of this gutta percha there is a jagged hole, exactly the size and shape of that given in the drawing. A minute observation of the interior of the wound will show that three of the wires at this point are snapped right across, the broken ends being all thrust in the same direction, namely, away from the spectator as he examines the drawing. The remaining four wires (there



are seven at the point *b*), however, remain intact. The uninjured wires can be seen at the lower side of the wound, the weapon which made the hole having missed them.

The following information was received from Colonel Glover, R. E.: "The cable was laid on December 11, 1870, and its tests were satisfactory. It worked well until March 1, 1871, or three months afterwards, when a serious fault had developed itself, which prevented working. A vessel went out, found the fault, and repaired it on the 7th June, 1871. The fault was 222 miles from Singapore, and in thirty fathoms water, the bottom being marked sand and mud. The report which came home to us was that a bony substance had been found jammed hard in the cable through the wires, and it was supposed to have been done before laying. As we could not understand why the original tests should be good if the substance had not existed, and why failure should be sudden, I did not believe this; and on receiving the faulty specimen I went to Willoughby Smith, and we opened it together. The bony substance appeared to us a fish tooth, probably a shark's; but as no mark of the other jaw appeared, we were puzzled, and give it to you. This is all the information we possess, nor, indeed, can get more, as no persons have seen it since."

I confess I was exceedingly puzzled with this most difficult problem. The hole towards the spectator is two thirds larger than it is on the opposite side. If it had been an ordinary fish, such as a shark, there ought to have been the marks of a bite on both sides of the cable, namely, of a tooth in both the lower and upper jaws. This wound, therefore, must of necessity have been made by a fish having but one tooth, and one tooth only; but what fish is there that has only one tooth? For several weeks I placed the specimen on my mantlepiece, and was constantly thinking over the puzzle. At last one day I hit it off all of a minute. On going round my museum I observed with most intense interest a beak or saw of a sawfish (*pristis antiquorum*) presented to me by Dr. Day, Inspector of Indian Fisheries, the fish having been taken in the Andaman Islands. "That's the fellow," I said to myself, "that made the hole in Mr. Latimer Clark's telegraph cable;" so, taking one of the teeth out of the beak of the sawfish, I placed a spare portion of the telegraph cable on the table, and struck the end of the tooth with the mallet, and immediately produced a wound almost, I may say exactly, similar to that found on the Penang telegraph cable. This tooth is seen at B.

My theory is very simple, namely, that the perpetrator was a big sawfish. The cable lay at the bottom of the sea, when day a sawfish came by hunting for his dinner. The sawfish gets his food by waving his saw right and left, turning up the mud or sand in order to dislodge the delicate bodied marine creatures on which he subsists. His teeth will tell us he cannot eat hard substances. When thus engaged in his submarine diggings, he suddenly came across the telegraph cable. His beak getting entangled in it, he gave it an extra blow and a smash downwards, and finally, getting enraged, hit it so hard that one of his teeth went between the outer wires—through the hempen rope—and then through to the gutta percha, injuring the wires. These various substances probably then held the tooth somewhat tightly. The fish then struggled and broke his tooth short off, leaving a bit of it actually imbedded in the cable among the wires.

I am inclined to think that the sawfish uses his formidable weapon to stir up the mud in search of his food, because the points of the teeth in the saw, which are composed of very hard bony substance, are as sharp as the tips of a wild boar's tusk, which are kept finely pointed by constant friction.