THE MODERN STEAM LAUNDRY.

The Empire Steam Laundry, of this city, presents an example of how modern laundry work is done. The requirements of the great steamboat and steamship companies, and of the hotels and restaurants, far surpass anything known of in the past, and to execute their laundry work appliances of the most perfect description are required.

In our illustration we represent several phases of the work as executed in the largest laundry of this city, an establishment which must be among the great laundries of the world.

When the articles are received in the building an account of their number is sent with them, or sometimes they are counted there. The washing machines, which are shown in one of the cuts, are cylindrical boxes containing each of them a drum of nearly their own diameter, and perforated with holes and with an opening through which the goods are introduced. The articles are put into this interior drum by hand, the door is closed and bolted and water is turned in and the machinery is started. The machinery rotates the drum alternately in one direction and in the other, an automatic belt shifter being provided for reversing the motion. A solution of soap, one or two bucketfuls, is introduced, and the operation of alternate rotation in one direction and in the other is kept up until the goods are washed. The wash water is then drawn off and replaced by clear water, and the drum being still kept in motion a rinsing is effected. Ultimately, the water in which they are rinsed is heated so as to remove the last particles of soap.

The next operation is the drying or wringing of the goods. This is effected in centrifugal driers similar to those used in the sugar industry. These are seen at work in the drawing to the right of the washing machines. The wringer being stationary, the operator packs it as full of the linen as possible, stowing it compactly down in the drum. The shaft which carries rotating drum holding the goods is journaled at the top or at the bottom only; in the machine represented in the cut is suspended from the bearing; in other instances it is carried by a lower bearing only. The rapid rotation of the drum by its gyroscopic action imparts the requisite steadiness. When full of wet goods, the belt is thrown on the moving pulley and the drum begins to rotate slowly, acquiring speed gradually. The action of the centrifugal force on the goods is quite interesting. When the wringer starts it is packed full to the top. As the drum acquires velocity the goods are forced out against its periphery, so that eventually the linen is all squeezed into a hollow cylinder and the center of the drum is quite empty. The water that is thrown out through the perforations of the side of the drum is caught by the casing and runs away. The articles are now ready for the mangling or ironing.

As an object of interest, we reproduce in the cuts one of the old-fashioned mangles, which is still in use and gives good satisfaction for a certain class of articles. A large box weighted with iron and stone and other refuse material is caused to travel back and forth over the table. At the ends of its course, wheels carried by brackets on one or the other end of it, as the case may be, striking on an inclined plane, raise first one end and then the other. The goods to be mangled are wrapped around a wooden roller together with a light blanket or cloth. As the box tips up at the end of its course, one of these rollers is placed under it, then as the box returns, its weight comes upon the roller, and rolling thereon, completes its course, subjecting the material to very heavy pressure at the ordinary temperature. The roller is removed at the release and the article is taken from it and another one put in its place.

Several of these machines are used and are found to give, for a certain class of goods, a better finish than the hot process machines.

Several kinds of hot process mangles of the more modern construction are employed in these works. The one we illustrate is known as the Hagan mangler. In it four rolls geared together rotate over a four-sectioned steam table. This steam table is grooved where the rollers come upon it, so as to almost fit their peripheries. The rollers are covered with felt, one edge of this being pasted to them by starch paste, the rest wrapped around them in such a direction that the natural rotation of the rollers tends to draw it always tighter. In operation the goods are straightened out, as shown in the cut, at the side of the machine furthest from the reader, and are inserted beneath the first roller. This catches them between its periphery and the smooth and highly heated steam table, and draws them forward, smoothing them out and delivering them to the next roller; this in turn delivers them to the next, and so on to the fourth, they finally coming out at the nearer end of the machine dry and mangled or ironed. The rollers are spaced some distance apart, and as the damp goods go through them clouds of steam escape from the three interstices, so that one passage through this machine virtually dries them and leaves them ready for folding.

In other mangles an apron is used to facilitate the passage of the goods. One point in the arrangement of the successive rollers in this type of machine is to wrap them with a little greater thickness of felt or cloth as the delivery end is nearer, to make the rollers successively increase in diameter from the first to the last. This increase is very slight, but it is enough to produce an increased rate of feed, so as to bring a slight tension to bear upon the goods as they go through. The mangles are heated by steam, turned into the hollow rolls or tables. The hot process mangles effect the drying. Sometimes the articles are passed through them a number of times in order to complete it.

When large articles have to be mangled, ordinary steam room drying is resorted to, and one of our cuts shows the drying chambers. These are simply large rooms with very long steam coils arranged near the floor and provided with racks that roll in and out on elevated tracks and rollers. On these racks the goods are hung, the racks being drawn out into the room; the racks are then pushed back into the drying chamber, the doors are closed and the goods left there until dry.

The capacity of the laundry is put at 100,000 pieces per day. The washing machines will accommodate 300 sheets at a time, or 1,500 towels. To illustrate their capacity for quick work, the following may be cited:

The river steamboats deliver their goods in the morning and take them away in the afternoon, it being quite possible to receive a consignment at 12 o'clock and turn it out finished at 5 o'clock in the afternoon. Sometimes a single ship, such as the Etruria or Umbria, will bring in from 20,000 to 25,000 pieces in a single consignment. It will be seen from this on how large a scale the work is done.

One interesting feature of the establishment is that they manufacture their own soap. Five hundred pounds of tallow, of the very best quality, are melted down, and to it are added 10 pounds of caustic potash and 70 pounds of caustic soda. These are heated to between 100° and 125° F. The saponification takes place without the addition of water, and after a thorough reaction, the soap is allowed to cool and is ready for use. It is not delivered solid to the laundrymen, but 75 pounds of it are dissolved in a tank containing 600 to 700 gallons of water, and from this one or two buckets are taken at a time to be thrown into the washing machines.

Photographing by Binoxide of Nitrogen and Bisulphide of Carbon.

We know that bisulphide of carbon burns in the air with a blue flame, and that mixed with the gas binoxide of nitrogen it also burns, but giving rise to a magnificent violet light, extremely rich in chemical rays. It suffices to have seen this flame to perceive all the advantages to be obtained from it. The treatises on photography make no mention of this source of light, and nevertheless, in certain cases, it might be preferable to many others. Is it because the bisulphide of carbon has a disagreeable odor, or because it is tedious to prepare the binoxide? Perhaps so. In any case, after experimenting, we advise amateurs to make some trials. We affirm that they will be astonished at the results obtained. The photographic power of this flame is incontestably superior to that of magnesium. The light produced is neither dazzling nor blinding, and is very far reaching. The background of the apartments show admirably on the plate, and the subjects no not make the horrible grimaces too often remarked when using magnesium. Here is the mode of proceeding:

After having focused and placed the sensitive plate, the objective is uncovered; then a lighted candle is brought near to a bottle containing one or two quarts (according to the size of the rooms), filled with binoxide of nitrogen, and in which have been previously poured a few cubic centimeters of bisulphide of carbon. Care must be taken to thoroughly agitate the liquid so as to completely saturate the gas. I advise operators to make this mixture of gas and bisulphide in the open air, and to bring the bottle well stoppered into the room before approaching the lighted candle. As the combustion evolves sulphurous acid, the bottle should be placed near a window opened at the time of lighting the mixture, or at the entrance of a door.

As to the binoxide of nitrogen, it is prepared in the same manner as hydrogen: in a quart vessel with two tubulars, in which are placed 30 grammes of copper (in pieces) and 100 grammes of a mixture of commercial nitric acid, and at least one-half of its volume of water; if the disengagement is too active, add water; if it becomes slower, add a few cubic centimeters of undiluted acid. The preparation is made in the open air, and in advance, as the gas will keep indefinitely. It should not be inhaled, as it is changed into red acid fumes as soon as it comes in contact with the air. I have constructed a special continuing appliance, allowing no bubble of binoxide to escape, and which may remain permanently in the laboratory. The continuing apparatus of Deville, which we might feel tempted to use here, is objectionable on account of its allowing the fumes of the nitric acid to escape into the atmosphere. I will revert to this subject in another article, and to the working of a new non-explosive lamp, by means of which beautiful portraits may be made at night, which is so rarely successful with magnesium.—*V. Lirondelle, in Bulletin de la Societe Photographiques du Nord de la France; Photography.*

Professor Eben Norton Horsford.

Professor Eben Norton Horsford, formerly Harvard instructor, died recently in Cambridge, Mass. Professor Horsford was born in Moscow, Livingston County, N.Y., July 27, 1818, his father being Jerediah Horsford, a colonel in the war of 1812 and member of Congress. Prof. Horsford was graduated from the Rensselaer Polytechnic Institute in 1838, went to Germany and spent two years in the study of analytical chemistry and experimental research in the Liebig Laboratory at Giessen. On his return was elected to the Rumford professorship of science applied to the arts in Harvard, spent the next sixteen years in the first laboratory organized and equipped for instruction in analytical chemistry in this country. He then resigned to go into the business of manufacturing chemicals in Providence, R. I., and afterward became president of the Rumford Chemical Works, in Boston. Professor Horsford discovered acid phosphate. He was an able writer on scientific subjects, and more than thirty years ago he published an account of the result of many successful experiments for stilling waves by spreading oil upon the surface of the sea, and he lately gave to the world a lexicon of five Indian languages. During the closing years of his life Professor Horsford took a great interest in Wellesley College. He provided for the endowment of the library and for continuous supplies to the departments of physics, chemistry, botany and biology.

Chromium.*

BY EM. PLACET.

Metallic chromium has hitherto been nothing but a laboratory curiosity, and in most instances the name has been given to a more or less pure carburet of chromium. I have succeeded in obtaining the metal by a new electrolytic process, which I will succinctly describe.

An aqueous solution of chrome-alum is prepared, to which is added an alkaline sulphate and a little sulphuric or other acid. This solution is then electrolyzed. At the negative pole a beautifully brilliant deposit is formed on the surface of the electrode, and this deposit consists of pure chromium. The metal is very hard, and is of a beautiful blue-white color. It resists atmospheric action perfectly, and is only attacked by concentrated sulphuric acid, nitric acid, and a concentrated solution of potash. When the electrolytic deposit takes place under certain conditions, it is even possible to obtain arrangements of chromium crystals, which recall the branches of fir trees. This metal, which can now be prepared on a thoroughly commercial scale, furnishes numerous alloys, which are being investigated.

I may add that this new process has led me to investigate "chromage," if such a word be permissible, or the electrolytic deposit of chromium upon the surfaces of different metals and alloys. My experiments have succeeded perfectly. With baths similar to the one described above I have obtained an adherent deposit of chromium of a thickness variable at will and resembling oxidized silver, upon brass, bronze, copper and iron.

I am glad to be able to place before the Academie a specimen of metallic chromium weighing more than a kilogramme; also samples of chromium alloys and brass ornaments electroplated with chromium.

Fast Torpedo Boats.

The famous torpedo boat builder at Elbing, Schichau, has just attained an unprecedented speed even for this class of vessel, torpedo boats built by him for the Russian and Italian governments having reached 27½ knots on an hour's run at sea. The new British boats are to be 200 tons displacement, while the Russian boats are 130 tons, so that the former may do better by reason of greater power and greater size. The length of Schichau's boat is 152 feet 6 inches, the beam 17 feet 5 inches. She may carry 40 tons of coal in her bunkers. On trial, however, she had only 20 tons on board. The small guns carried weighed 2½ tons; the torpedo armament, 6 tons; the crew, provisions, stores, and firearms, 4½ tons; drinking water, 2½ tons; engine and boatswain's stores and reserve parts, 4½ tons—so that all the movable parts come to 20 tons, making, with coal, 40 tons. The vessel and the machinery are, therefore, very light. The shell plates are barely a quarter of an inch thick. There are two locomotive boilers, protected by the coal bunkers, supplying steam at 195 pounds pressure to high speed engines. The guaranteed speed was to be 26½ knots in the open sea, while on trial the vessel actually made 27½, or to be precise, 27·4 knots, as a mean of one hour's steaming at sea. Schichau promises even higher results with torpedo boats he is now completing.—*The Steamship.*

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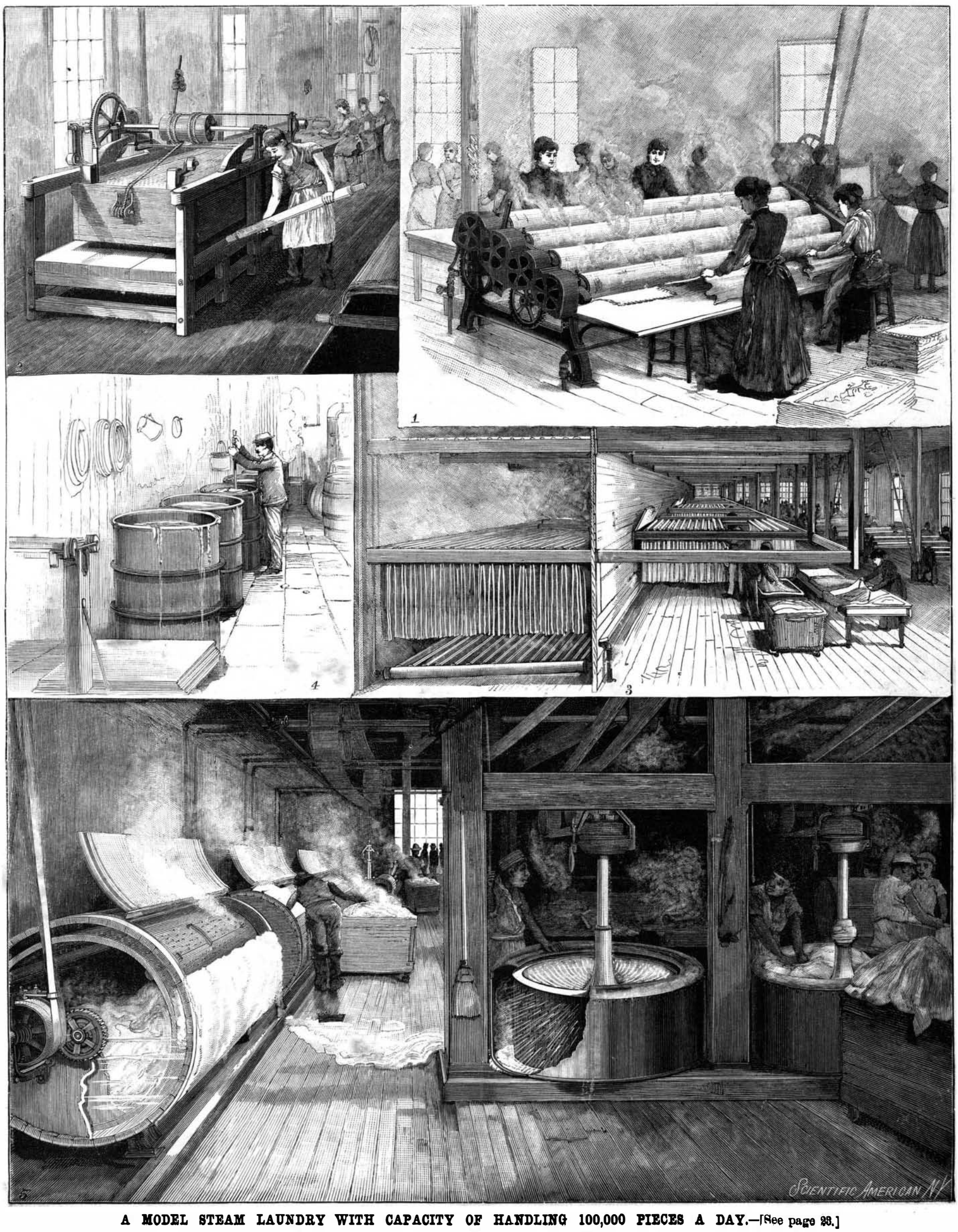

A MODEL STEAM LAUNDRY WITH CAPACITY OF HANDLING 100,000 PIECES A DAY.—[See page 23.]