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THE INDUSTRIAL CONDITION OF THE UNITED STATES IN 1860.

The eighth census of the United States was taken in 1860. The inquiries embraced not merely the number of persons, but also the number of domestic animals and a great mass of statistics in relation to the industry of the people. Since the returns of the marshals were made at the Census Office in Washington, the Superintendent, C. G. Kennedy, Esq., has been busily at work arranging them for publication, and the preliminary chapters of his report have just been issued. They contain statistics from which we have prepared a general view of the condition of the country when the census was taken, that will be found on another page.

In 1607 the first permanent English settlement on this continent was made at Jamestown, in Virginia, and during the 255 years that have since elapsed a steady stream of immigration has poured across the Atlantic, while the descendants of the earlier settlers have been constantly multiplying, producing an aggregate population in 1860 of 31,749,281.

The continent at the time of its settlement was principally covered with a dense forest and most of the settlers were poor, but they were eager to improve their condition by industry and economy, and they had the sagacity and resolution to found and maintain a republican government which secured the most perfect protection of life and property at the smallest cost, while it left the citizen untrammeled by restraining enactments to pursue his own well-being, under the stimulus of free competition and the natural laws of trade. At the same time the founders of the Northern States most wisely made provision for the general education of the people. The combined industry of the nation, thus guided by intelligence, protected by law, unburdened by taxation and left free in its development, produced results which are accurately shown by the census statistics, and which have never been equaled in the same length of time and from the same beginnings. The continent has been cleared of its forest, made into cultivated farms, covered with comfortable dwellings, reticulated with roads, canals and railroads, and otted all over with opulent cities. The mass of he people are supplied with food, clothing, dwellings, and other means of comfort and enjoyment immasurably superior to those of any other people tht ever existed.

Unfortunately a few negro slaves were imported int the country from Africa and their descendants nownumber 4,441,765, of whom 3,953,760 are still slavs, the others being free. In the Northern Stats the slavery system was soon abandoned, but in th Southern States it has been cherished, and as the ontrolling sentiment in those States was opposed o popular education, the two evils together —the avery of the blacks and the ignorance of the whites-have generated a state of society which seems to be ıcompatible with the free institutions that have cated our prosperiity, and which has resulted in a desperte effort to overthrow them. If this effort succeedsıo future census will exhibit so satisfactory results asthose of 1860, for our wealth will decline, like thatof tne Grecian, Italian, and all other republics aer their institutions were overthrown; and even i the effort does not succeed, it will inflict a very serius check on the prosperity of the country. The lessons of the war will cause a great augmentation of the naval and military force, which, with the interest on the public debt, will multiply the taxes; burdening the industry of the people with a load that will powerfully tend to repress the growth of our wealth. For a generation to come the censuses will probably exhibit a much less rapid advancement than that which is shown by the eight that have been taken.

Each year, however, from the increase in machinery and improvements in the modes of operation, we are able to produce a larger amount of wealth than during the previous year, and if the rebellion is pretty quickly subdued, we shall soon pay off the national debt and resume the multiplication of our means, probably with greater rapidity than ever before.

THE LONDON EXHIBITION—AWARDS TO AMERICAN EXHIBITORS.

The communication of our London correspondent, Mr. Holmes, on another page, contains a very full and interesting account of the awards of first and second-class prizes to American exhibitors at the World's Fair. We feel highly gratified with the success which has attended the efforts of our inventors. In proportion to their numbers their productions excelled those of all other countries under similar classes, and particularly so in mechanism. It is an unquestionable fact that in labor-saving machinery more progress has been made in America during the past quarter of a century, than in any other country, and this has been felt and acknowledged by British mechanics, and to an unlooked-for extent by the English press. It is also gratifying to learn, as stated by our correspondent, that a number of our exhibitors have been successful in a pecuniary sense in disposing of their patented inventions to good advantage. They have thus opened up new avenues of trade in Europe to other American inventors who may profit by their example.

The Superintendent of Machinery, D. K. Clark, C. E., an inventor and author of the well-known work "Clark's Railway Machinery," paid the American exhibitors extraordinary attention. It appears to us that the troubles of our country led the authorities connected with the Exhibition to treat our exhibitors with more favor than they would have done under other circumstances, for it was distinctly stated, at the outset, that no awards would be made to any country which refused to appoint a Commissioner. This rule was waived in favor of American exhibitors, and no distinction has been made between them and the English themselves. Undoubtedly this courtesy and kindness were due chiefly to the efforts and influence of our correspondent, Mr. Holmes, who has arduously devoted his time and energies to the cause. He stated to the Royal Commissioners that the American exhibitors who had forwarded articles to the World's Fair did so in good faith that their Government would appoint a Commissioner, and upon this candid statement a department was allotted for their products, and every proper consideration extended to them, although no Commissioner was appointed by our Government. Thus, out of ninety-eight actual exhibitors, no less than eighty received awards; but out of thirty-two exhibitors of "machinery in general," no less than twenty eight secured prizes. Never before have so many laurels been won in any industrial contest by a proportional number of candidates. It was perhaps fortunate that the majority of these inventions had been illustrated and described in the columns of the SCIENTIFIC AMERICAN, and that a knowledge of their merits had thus been previously disseminated among European mechanics and manufacturers.

It affords us much pleasure to state that the British Commissioners and the Juries have treated our exhibitors with marked kindness.

AN OPENING FOR A GREAT DISCOVERY.

It is well known that iron deposited by the electric current is generally destitute of solidity or strength. We are informed, however, by Mr. L. L. Smith, of College Point, Long Island, an experienced electroplater, that he has seen iron deposited by the battery solid, tough and fine grained. Mr. Adams, of Brooklyn, showed him a piece of this character an eighth of an inch in thickness.

Now, the forces of nature are invariable in their operation, and if the same conditions which produced that piece of iron can be again combined, they will inevitably produce the same result. It is certain that good iron can be deposited by the battery, all that remains is to learn the method by which it can be done.

If this art can be found the discovery will be one of the most valuable that has ever been made. There are a great many places in which it is desirable to have pieces of wrought iron of such size and form that they are exceedingly difficult to forge, but which could be fashioned with the greatest ease if iron of the desired quality could be deposited by the battery. It is conceivable, even, that the model of a vessel might be built up in a light framework of thin boards, and placed in a great dock or basin which could be filled with the iron solution, and that thus an iron ship of any desired capacity, with its sides, beams, decks, and armor plates, could be formed in a single piece! As tide wheels might be used to drive magneto-electric machines, the process would perhaps be cheap even if it required months or years to complete the deposit.

Should not this magnificent idea be realized, there are innumerable more modest applications in which the art of depositing iron by the battery would be of incalculable value, and as it is certain that the result is possible, we know of no more inviting field for exploration by our men of science.

THE PHOTOGRAPHIC ART A BLESSING TO THE WORLD—CARTES DE VISITES.

Of all the arts the one that seems most miraculous is photography. That the rays of the sun, darting through space with a velocity of a hundred and ninety-two thousand miles in a second, should, after bounding and rebounding from the walls of a room millions of times, till they cross each other in every conceivable direction, be directed upon a bit of paper and made to print a likeness accurate in all its microscopic details, would certainly have been deemed impossible before it was done, and yet there are large numbers of persons who by the daily performance of this miracle obtain bread and meat for themselves and little shoes and bibs for their children.

The most valuable feature in this wonderful art is the cheapness and facility with which it is performed. Heretofore, a few individuals in the community have been able to have their portraits painted by artists who, after devoting years to study and training, have been able to produce a picture bearing some resemblance to the person for whom it was designed, but the pictures of the photographer, though possessing a fidelity unapproachable by any painter that ever lived, are produced with a rapidity and ease that places them literally within reach of all classes in the community. This art contributes a thousand fold more to the sum of human happiness than the art of painting.

The ease with which photographs are taken, and the cheapness at which they are sold, has reached its highest development in the carte de visite. A man can now have his likeness taken for a dime, and for three cents more he can send it across plains, mountains, and rivers, over thousands of miles to his distant friends.

One of the most interesting results of the ease and cheapness with which photographs are produced is the prompting which it will give many persons to have their likenesses taken frequently during their lives. What would a man value more highly late in life than this accurate record of the gradual change in his features from childhood to old age? What a splendid illustration would such a series of photographs make in every household. First, the new-born babe in his mother's arms; then the infant creeping on the floor; next the child tottering by the mother's apron; then the various phases of boyhood, till the sprouting beard tells of the time when the plans and hopes of life began to take form and purpose; another portrait with softer locks and eyes is now coupled with the series, and the stern warfare with the world begins; the features henceforward grow harder and more severe; lines slowly come into the forehead and grey hairs mingle with the locks; the lines grow deeper and the head whiter, till the babe is changed into the wrinkled and grey old man, so different but still the same! Even when life is closed the power of the photographer has not ceased. The fixed fea-

tures that return no answering glance to the last fond look of surviving love are caught and indelibly preserved to its memory.

The Stevens Floating Battery in 1852.

In looking over the back volumes of this paper our attention has been attracted by the following article which appeared on page 285, Vol. VII. (old series) SCIENTIFIC AMERICAN (1852). Steam batteries being a theme which is exciting the interest of all nations at the present time, we think it desirable to refresh the public mind in regard to what was thought of the subject ten years ago :—

On the 11th instant (May, 1862), Senator Stockton addressed the Senate at length on the resolution authorizing the building of a war steamer for harbor defence, in pursuance of a law authorizing a contract for that purpose with Robert L. Stevens. He said he desired to impress upon the senate the necessity of providing a harbor defence, and to have justice done to one of his constituents who had been ungenerously treated by the former Secretary of the Navy. "It was his opinion that the present state of affairs in Europe rendered war probable, and in that event there was danger of us being brought into it. The harbor of New York is not now any better than it was during the war of 1812, and fleets now approached the United States uninterrupted by winds or tides. With a speed of 20 miles per hour, a steamer could pass beyond the range of a fort in five minutes. To obviate the attack of a foreign fleet, it was necessary that there should be a construction for harbor defence, combining the qualities of stone with the power of motion. This vessel being shot and bomb proof, could do more to resist the progress of hostile fleets than twenty forts. Mr. Stevens, the author of the design, is an accomplished and experienced gentleman, who is willing to hazard his character and reputation on the success of the undertaking." Thus, and a great deal more, senator Stockton spoke in reference to a steam floating battery.

A petition has also been presented to Congress by a person professing to be acquainted with steam navigation, who believes that he can construct an ocean craft which can neither be burnt or sunk (even if stove against icebergs or rocks), nor blown up by its boilers, and which will average, in a voyage across the Atlantic, fifteen miles an hour, and he will undertake to build the vessel providing the Government will remunerate him in case of success. He asks Congress to place in the Deficiency Bill a provision giving him and his associates, or their legal representatives, the sum of one million of dollars upon condition of his producing such a vessel within five years from the passage of the act, to be adjudged and reported on by a committee of five disinterested persons to be appointed by the President, on whose decision the Secretary of the Navy is to pay the money. The plan is, that the vessel is not to be less than four thousand tuns, forty rods long, and six wide; to draw only from five to six feet of water when laden. She is to have two sets of boilers and engines, and four pairs of water wheels; is to be of iron entirely, with zinc finishing; the keelsons, ribs, &c., are to be of plate iron corrugated where proper, and made air-tight, forming air chambers. The floors or decks will be double, having sectional air chambers throughout, as will also the portions of the ship, including those forming the state rooms, cabins, &c., thereby rendering it impossible for her to sink. She is also to be subdivided by water-tight partitions. Although five years are asked, the memorialist says he can accomplish the work in two; and although the condition of speed is fixed at the moderate rate of fifteen miles an hour, he has no doubt of accomplishing an average of from twenty to twenty-five miles per hour, besides having her shot proof.

Here, then, are two Richmonds in the field. The latter proposition, we believe, is the best. Mr. Stevens will no doubt accomplish anything he undertakes in the steamboat line, but a harbor floating fort would be a most useless appendage. Let us have a good steam fleet; let our sea defence be upon the mountain wave. In an emergency, sand bank barricades can be thrown up for the defence of our harbors, and these, with heavy guns and brave hearts, need fear no foreign floating batteries.

NITRIC ACID FUMES.—Two men, employed in a chemical manufactory at St. Denis, France, were lately found dead in the street soon after leaving their work. Their bodies were removed to the Morgue for examination. The medical opinion was that their death was due to the inhalation of the fumes of nitric acid.

THE MANUFACTURE OF LEATHER CLOTH.

The London *Mechanics' Magazine* gives an interesting description of the manufacture of enameled oil cloth which it calls "leather cloth" and states that it was introduced into England from America, having been commenced at Newark, New Jersey in 1849. The establishment of Messrs. Crockett in London, England, in which it is made, is very extensive, covering ten acres of ground, employing 200 operatives, and turning out 15,000 square yards daily. Respecting the processes by which it is produced, our cotemporary says :—

It will be evident that an article intended to resemble leather should be pliant, supple, and not liable to peel off or to crack. These excellences are to be attained by the peculiar ingredients of the composition with which the cloth is covered, and the method of applying it. On entering the factory our attention was first directed to the boiling room, in which there are twelve furnaces, with a large cauldron over each for boiling linseed oil. This process is attended with considerable danger from the liability of the boiling oil to generate gas and explode; hence, a man is stationed at each cauldron stirring gently the boiling mass and watching a thermometer inserted in it, and which at the time of our visit stood at 580°. The oil is supplied to the boiling house by pipes from an adjoining building, where there is a huge tank with nine compartments, containing 3,200 gallons each, or 28,800 altogether, amounting to 122 tuns of oil. The boiled oil being allowed to cool is conveyed on a tramway to the mixing house, where, in a puddling machine, it receives several other ingredients, the principal ones being lampblack and turpentine, which being mixed into a composition is ready for use.

The cloth to which this composition is applied is known by the name of "greys," or unbleached cotton. It is of a peculiar manufacture, and made expressly for the company. The store room is a spacious building, and will contain an immense stock; at present it has 25,000 pieces, or 300,000 yards. Here the cloth is calendered, and cut into lengths of twelve yards. The two ends of each length are sewn together to make it endless; two sewing machines are in constant operation at this work. The pieces are then removed to the "milling" rooms, so called because they contain the mills on which the cloth receives the composition. These mills are rough-looking wooden structures, having a drum at one end and a roller at the other, over which the cloth is passed, and then tightened by a crank and wheel at one end. A large frame knife or scraper is then dropped down close to the cloth, a measured quantity of composition being laid on the cloth along the edge of the knife, the mill revolves, and the cloth receives as much of the composition as can pass under the edge of the knife. The piece is then carried to the heating room adjoining, and hung up on the rack to dry till next morning.

There are on the premises six milling rooms, with three mills in each, and having three men attendant upon each mill. The adjoining rooms for drying are heated by three rows of pipes laid along the wall. These pipes, during the day, are at a temperature of about 130°. The temperature is increased toward the evening, and during the night to 160°, and it is the duty of the watchman to open the doors for ventilation and cooling preparatory to the men resuming their work for the next coating.

Of course, in a building so greatly heated, and having so much inflammable material within it, the danger of fire is imminent, but every precaution has been taken which prudence could dictate. The building is fire proof, the doors are of metallic lava, and the roof, which is flat, is of the same material. A large pipe runs up the outside wall by the partition which divides the drying rooms, into each of which runs a branch pipe with a valve, which can be worked from the outside. A deluge of steam can by these means be poured into the rooms in a few minutes by day or night. There are fourteen fire plugs around the buildings, on the main of the East London Waterworks, with hose and turncock at hand, so that ample means of extinguishing fire exist on the premises.

But to return to the manufacture. The coating being thoroughly dry, the cloth is then taken to the "rubbers," whose business it is to remove all inequalities from the surface and make it perfectly smooth. This is done by the "rubbing machine" (an ingenious contrivance of Mr. Eagles, the manager), by which the cloth is made to pass under two rollers revolving in opposite directions. These rollers are covered with pumice stone, and do the work completely and expeditiously, which, till lately, was done by hand at great expense of labor. The "coating" and the "rubbing" being repeated four, and in the case of heavy goods, five times, the cloth is ready for the "painters." The "painting rooms" contain machines similar to the "mills;" but instead of the drum they have a roller at each end, over which the cloth passes slowly, and a man at each side applies the paint, "meeting each other half way." Dependent partly on the colors, and partly on the article to be produced, is the number of coats of paint to be applied. Sometimes two will be sufficient, at other times four are necessary. The last coat receives several applications of a peculiar elastic enamel, composed chiefly of copal varnish, to protect it from the action of the atmosphere.

At this stage of the process the edges of the cloth are rough and have to be trimmed, and the seam by which the ends are sewn together has to be cut. This is done by a machine called the "Guillotine," and we now follow the cloth to the "grainer." This latter, and, to the ordinary leather cloth, finishing process, is done by a remarkably beautiful iron machine, having two rollers, the upper one being of polished iron grooved obliquely on the surface, the under one of paper. Between these two rollers the cloth passes twice and receives its external resemblance to morocco leather. There are six machines used for this finishing process, and others for embossing from the small diamond to the large mediæval pattern. The latter consumes much more time in passing through the machines. The cloth is now stamped with the trade mark, labeled, and rolled up ready for transmission to the warehouse in Cannon street West.

On looking at the pieces when finished, one is struck by the extreme cleanness of the inner side after passing through so many soiling operations; this is owing to the practical skill with which the men handle the cloth, and to the agility with which they remove it from the several machines, and carry it to the drying rooms. While watching the process we thought that, in many respects, it was similar to the tanning with sumac, from the leaves and stalks of the *Rhus coriaria*, by means of which skins are made into morocco leather. As the leather cloth can be made permanently soft and elastic by the oily matter combining with the texture of the cloth, as it does with the fibres of the skin, the imitation is complete and successful.

There is another room in this establishment, specially interesting to the artist, where the cloth i printed in gold and colors, in designs which are reall chaste and beautiful, and which, when used for th furniture and hangings, adorn rooms with somethig of oriental splendor. Here, too, there are tale covers with floral borders, rich in color and choicin grouping, with center pieces which, as specimen of decorative art, are very effective.

The French have been acquainted with the at of making oil cloth of this kind for a long time an we think they were the first who commenced its manufacture. A description of French oil cloth is given on page 105, Vol. V., 1849 (old series), SCIENTIFIC AMERICAN, with a more minute account of the ingredients used. There is also a description of G. DeBruns' French patent for the manufacture of oil cloth on page 265, Vol. XIV., 1859 (old series), SCIENTIFIC AMERICAN. Sulphuric acid and the sulphate of zinc, also the oxide of lead are boiled and mixed with linseed oil to render it quick drying for the manufacture of this kind of cloth.

IN 1851 the value of machinery exported from England was £1,168,611 sterling ($5,843,055), last year it amounted to £4,250,000 sterling.