THE MANUFACTURES OF PATERSON, N. J.

EARLY HISTORY—THE SOCIETY FOR ESTABLISHING USEFUL MANUFACTURES—ALEXANDER HAMILTON—THE FIRST COTTON MILL AND PRINT-WORKS.

Within the recollection of persons still living, the site of the active and prosperous city of Paterson consisted of little except swamps and woodlands. One tavern and three or four farm-houses stood near the only avenue by which the Falls could be reached from the direction of New York. The first of these edifices, now part of the "Passaic Hotel," alone survives as a relic of the past, when the cataract, like the dusk-complexioned wanderers around it, rejoiced in the exuberance of physical strength, ere the spinning-frame or the locomotive had been born of the human brain. Be it ours to chronicle the reverses and triumphs of organized industry, during a struggle of seventy years' duration, in the neighborhood of this interesting locality.

Nature evidently set apart that region as a vast field for manufacturing operations. In its mountains she locked up inexhaustible deposits of iron ore, of prime quality, and easy access. Their sides she clothed with dense forests. The plains she spread out upon a ground floor of old red sandstone, every here and there showing itself in graceful swelling or modestly hiding underneath the tall, grim cliffs of "trap," which she drew in vast lines parallel to the ocean shore. The best of harbors and the furthest navigable of Atlantic rivers were placed within sight; several chains of mountains, rising from 200 to 2000 feet, approached almost to the very margin of "the great deep," and across these she diverted the Passaic, at each of the passages precipitating itself from 50 to 100 feet. It needed only human intellect and skill to render that region one of the most productive and wealthy as well as picturesque on the face of the globe.

Imbued alike with sound sense and earnest patriotism, the founders of our republic felt that independence had been only half secured by the Revolutionary War. With the formation of "a more perfect Union," therefore, many leading spirits of that day began to turn their attention to the fabrication of those articles pertaining to the national kitchen. Samuel Slater, an Englishman, in 1789, had landed at New York with Arkwright's spinning-frame in his brain, the British government forbidding a model of it to be stowed in his trunk. In the following year he was engaged to construct and superintend these machines at Pawtucket, R. I.; the first ever put into operation on this continent.

In the early part of 1791, mainly through the exertions of Alexander Hamilton, an association of persons in the Middle States was formed to undertake manufacturing operations on an extensive scale. Application for an act of incorporation was made to the New Jersey Legislature, and a charter, which had been drawn up or revised by Hamilton, received the signature of Governor Paterson on the 22d of November following. This was one of the most liberal that could be devised, leaving the grantees unrestricted as to the locality to be selected, the time of commencement, or the period of duration. The capital stock was fixed at $1,000,000, in shares of $100 each; but real estate and other property might be held to the extent of four millions. Besides manufacturing, they might improve navigation by the construction of canals, locks, dams, &c., and charge tolls for the same. Their property was exempted from taxation ten years for State purposes, and for county and township purposes for ever. They might also raise $100,000 by lottery, if required. The inhabitants within a district six miles square might at any time be incorporated and form a municipal government, with the usual powers, privileges, and duties.

"The Society for Establishing Useful Manufactures" was immediately afterwards organized, when William Duer was elected governor, and Archd. Mercer, deputy-governor. The stock subscription then amounted to $200,000, but was afterwards increased to $262,000. The first business was to select a suitable location for their works; accordingly, advertisements were inserted in New York, Philadelphia and Trenton papers, inviting proposals. These were received from the West Jersey Associates, from South River, Perth Amboy, Millstone, Bull's Falls, the Little Falls, and the Great Falls of the Passaic, setting forth their several advantages. Engineers were sent to survey and report upon each. That of Cassimer T. Grover, then Surveyor of New York, estimates the power of the Great Falls, including the descent to tide water, as equal to 247 undershot wheels, and that of the Little Falls as equal to 78. Besides the excellence of the quarries and the abundance of timber, the practicability of improving navigation to the head-waters of that river is duly pointed out, and the directors are informed that bog iron ore is found near the Little Falls suffieient for very extensive works, also beds of red ocher, &c., &c. It is noticeable that all the first surveys contemplate the carrying of the Passaic by a canal to tide-water, near Acquackanonk. Christopher Collis, who made a hasty exploration of the spot, states that a cutting of 15 feet would be required for that purpose.

A meeting of the residents in that part of (then) Essex county was held at the house of John Stagg, in Acquackanonk, when a committee consisting of John Benson, William Colfax, and Abraham Godwin, was appointed to confer with the society. They were to point out the abundant supply of everything needed for a great manufacturing emporium, and to offer part of their lands—every alternate three-acre lot—at a reasonable valuation; finally, a portion of these might be given gratuitously, if nothing better would serve. A meeting was also held at Little Falls, when propositions were submitted for acceptance. Gov. Duer appears to have favored the latter, but a committee to whom the subject had been referred thought differently, and on May 17, 1792, resolved that the town of Paterson (named after the Governor) should be located at the Great Falls of the Passaic.

The cotton manufacture had from the first been considered the society's grand object, but their attention was at various times directed to other branches of industry. The governor was instructed to treat with "one Hancart who has a very superior knowledge" of the manufacture of tobacco, for his services. This project, however, was subsequently abandoned, whether because it could not be ranked among the "useful" species, we are not aware. Meantime, a purchase of nearly 700 acres of land, together with the river bed above and below the falls, was made at a total cost of only $8,230. Nehemiah Hubbard was appointed the first engineer and superintendent. He was succeeded by Major L'Enfant, a Frenchman of very extravagant ideas. In his first report this gentleman recommends the water to be conveyed in a canal to the Great Notch, a distance of three or four miles, before using it!

As a matter of interest we insert here a letter from Col. Hamilton, announcing the appointment of a number of subordinates:—

PHILADELPHIA, Dec. 7, 1791.

GENTLEMEN:—In consequence of powers vested in me by the agents named in the instrument of subscription towards the Society for Establishing Useful Manufactures, I have made contracts on behalf of the society with William Hall as superintendent of the Printing business; with Joseph Mort as an assistant in the manufactory in such a way that his services may be thought most useful. This gentleman, I understand, has had opportunities of being acquainted both with the making and printing of cotton goods. With Thomas Marshall to superintend the Cotton Mill.

The contracts with these different persons are transmitted herewith.

There is a William Pearce who has been employed by me in preparing machines for the use of the society, and with whom I have advanced pretty far in an agreement, but without having reduced it to a definitive form. He pretends to a knowledge of the fabrication of most of the most valuable machines now in use in the cotton manufactory, and his execution hitherto, so far as he has gone, confirms his pretensions. Among other machines he has prepared a Double Loom, to be worked by one person. Of this he gives himself as the inventor, and has applied for a patent, which he will probably obtain. It is certain that the machine, if in use at all in Europe, is quite new; and, as far as without seeing it worked it can be judged of, promises to answer the expectation it gives. With Geo. Parkinson as Foreman or Master of a room in the Cotton Mill. This appears to be an ingenious mechanic who has obtained a patent for a Flax Mill, which he alleges his having improved. How far these improvements may be of real utility, or the Mill itself capable of answering its end, ought to be considered uncertain, since it is a question whether the spinning of flax by mills, which has been for same time a desideratum in Great Britain, is practicable. The object of engaging this man was to secure to the society an ingenious mechanic, and securing to them whatever advantages there might be in the patent.

All the contracts leave to the society the power of dismissing at pleasure, if on experiment they find it their interest.

I thought it advisable, in the first instance, to secure persons of whose usefulness there was reason to entertain a favorable opinion, though upon terms which may appear high, that the business might be early put in motion.

It is a point understood between Mr. Mort and myself that, if desired by the society, he is to go to Europe and bring over workmen, at his own expense in the first instance, but with the assurance of reimbursement and indemnification. To engage such a person as Mr. Mort for this purpose appears to me a point of some consequence.

Gentlemen, I have the honor to be, with great consideration,

Your obedient servant,

A. HAMILTON.

To the Directors of the Society for Establishing Useful Manufactures.

On the 4th of July following, the Board held their first meeting at Paterson, when the committee reported that they had visited the Great Falls, in company with Gen. Schuyler, and found it practicable to convey the water to Acquackanonk; but on consulting with Col. Hamilton it was judged best to erect their works at the Great Falls, and for this purpose sufficient lands had been obtained. A resolution was accordingly adopted that measures be taken to bring the water "across the gap to station No. 14," and there erect a cotton mill, also buildings for carrying on calico-printing, with the requisite machinery, together with buildings to accommodate the workmen. The sum of $20,000 was appropriated for the canal, $15,000 for the cotton factory and machinery, $12,000 for the print works, and $5,000 for a weaving-shop and its equipment.

Those who have visited the spot will recollect that the river has a total descent of 75 feet within a quarter of a mile. A dam has been constructed of immense blocks of stone bolted together to their rocky bed by powerful clamps of iron. The water is thus diverted into an artificial channel constructed across a deep ravine and through the rocks, which barely permits its passage. From this point it is made to turn in succession three tiers of factories, after which it is once more discharged into the river, at the distance of scarcely half a mile from the point of leaving it. At the time of which we write, a slender dam, 200 yards higher up stream than the present, supplied its place, while the ravine was converted into a reservoir, out of which the current passed into what is now the middle race-way. Along this it was conveyed 150 yards to the society's factory (near the Oakman mill). The immediate neighborhood, then and long afterwards, consisted of a low swamp through which several rivulets pursued their devious courses. It is now the most populous portion of Paterson.

The cotton and weaving factory consisted of a stone building, 90 feet in length by 40 in width, and 4 stories in hight. The bleach and print works were situated half a mile distant, near the site of J. C. Benson's silk mill; adjoining these was a large green. Bleaching by chemical preparations had not then come into operation, although we find shortly afterward that the superintendent was authorized to employ "one Tesserandot" who professed to have made such a discovery. The bleach-house was a frame building, 78 feet long and 3 stories high.

We have been thus particular in entering upon the details respecting these works, as being the first of the kind west of the Hudson, and the second on the continent, as well as in justice to the memories of many connected with the enterprise. Some of these have left an abiding record on the pages of their country's history, and all deserve to be gratefully remembered by posterity. As manufacturers they failed. Means, public spirit, and determination—"the will to do, the soul to dare"—were theirs; but lacking the practical part, and being unsustained by their country through its supreme legislature, they were doomed to disappointment, though not until they had laid the foundations of a work which has already more than realized their expectations.

Indeed, before the factory was completed, the extravagant expenditures of the society's funds had made itself painfully felt, and numerous were the shifts resorted to for the purpose of replenishing the treasury. Some stockholders refused to pay up their instalments, and an amendment to the charter had to be obtained, compelling them to do so. Complaints were made that an influential officer, entrusted with large sums of money, had furnished no account of the same. Large appropriations had been made to build houses for workmen and lay and the town. In these circumstances the directors decided to make use of their lottery privileges, and arrangements were made to dispose of tickets for $40,000. After an abortive attempt the scheme was reduced to one-sixth a

this amount. Among those whose names are mentioned as commissioners in the lottery, we find that of Governor Howell, then in office.

From one of the resolutions adopted by the Board, we find that the quarter-acre lot was then offered for sale at $88, or including a small stone house, $250. The workmen were offered long leases of both at a rent of $12.50 per annum.

At the next election, Nicholas Low was chosen Governor, and Elisha Boudinot Deputy-governor. Both continued closely identified with the society for many years, the latter as governor, from 1797 to 1813. A change in the subordinate officers being considered necessary, Peter Colt, then Comptroller of the State of Connecticut, was invited to undertake the principal oversight and manage the works "as if they were his own property;" Major L'Enfant remaining as engineer for some months longer. Mr. Colt entered upon his duties in February following, and continued in the society's service until adversity obliged them to succumb. He was dismissed in 1796, with a vote of thanks declaring that their failure "arose from causes not in his power, nor that of any other man to prevent." Mr. Colt removed to northern New York, and about 1814 returned to Paterson, where he resided until his death, in 1824.

The first cotton yarn spun in the State was produced in a plain wooden building which stood on the site of A. Prall & Co.'s new cotton factory, the machinery being driven by oxen. Yarn was made here during the summer of 1793. The main factory was completed and set going in the spring of the following year. It was fitted up with "four carders, four roving-billies, four stubbing-machines, twenty-five spinning-jennies, and sixty single looms." The bleach works went into operation shortly afterwards. The whole number of employees engaged was about 125. It is noteworthy that to procure a supply of mechanics one of the officers had to visit Europe, while the workhouses of New York had to be searched to find operatives for the cotton mill. "*Tantæ molis erat*," &c.

A number of enterprises received the attention of the Board, most of which have since been carried out by individual enterprise. The superintendent was directed to plant mulberry trees for the production of raw silk. George Parkinson was engaged to construct machines for spinning flax, hemp and wool. Outsiders also began to avail themselves of the water-power then furnished at nominal prices, and several applications were made for mill sites or rooms with power. John Campbell commenced the weaving of stockings, and John Richards that of different fabrics of cotton goods on hand looms. Thomas Marshall spun candle-wick and ginned cotton in partnership with the society.

Their affairs were in the meantime approaching a crisis. Among the adverse occurences was the loss of nearly $50,000, occasioned by the failure of parties to certain bills of exchange purchased by the company, to pay in England plain cloths for printing. Besides, war was raging in Europe, affording our merchants a lucrative business as carriers; consequently capital was more readily employed in that direction than in domestic manufacturing. The expense of transportation was enormous, the workmen mostly unacquainted with their duties, and disorderly at that. It need occasion no surprise, therefore, that in the Fall of 1795 the calico-printers were discharged, and that in July of the following year operations were entirely suspended. The society, however, did not become bankrupt, nor did it dissolve, although proposals to that effect were made. In a short time the population of Paterson, was reduced from 500 to 43 persons.

[To be continued.]

THE EFFECTS OF SMOKING IN FRANCE.

The remarkable research made by M. Bouisson upon the danger of smoking has attracted the notice of the Academy of Sciences in Paris, and has been rewarded with high praise. The horrors hitherto unknown, or unacknowledged, with which smokers are threatened, nay more, convicted by M. Bouisson, are sufficient upon bare anticipation to ruin the revenue and the pipe-makers also. Cancer in the mouth M. Bouisson declares to have grown so frequent from the use of tobacco that it now forms one of the most dreaded diseases in the hospitals; and at Montpelier, where M. Bouisson resides, the operation of its extraction forms the principal practice of the surgeons there. In a short period of time, from 1845 to 1859, M. Bouisson himself performed sixty-eight operations for cancer in the lips, at the Hospital Saint Eloi. The writers on cancer previous to our day mention the rare occurrence of the disease in the lips, and it has therefore become evident that it must have increased of late years in proportion with the smoking of tobacco. M. Bouisson proves this fact by the relative increase in the French duties on tobacco, which, in 1812, brought an annual amount of twenty-five millions, and now give a revenue of one hundred and thirty millions; almost that attained by the duties on wines and spirits, and far beyond that rendered by those on sugar.

The use of tobacco rarely, however, produces lip cancer in youth. Almost all Bouisson's patients had passed the age of forty. In individuals of the humbler classes who smoke short pipes and tobacco of inferior quality, the disease is more frequent than with the rich, who smoke cigars or long pipes. It becomes evident, therefore, that it is owing more to the constant application of heat to the lips than to the inhaling of the nicotine, that the disease is generated. With the Orientals, who are careful to maintain the coolness of the mouthpiece by the transmission of the smoke through perfumed water, the disease is unknown. M. Bouisson, whose earnestness in the cause does him the utmost credit, advises a general crusade to be preached by the doctors of every country against the immoderate use of tobacco, as being the only means of exterminating the habit.

TRAVELING FAST AND SLOW OVER BRIDGES.

MESSRS. EDITORS:—On page 222 of the present volume of the SCIENTIFIC AMERICAN, in reference to the stability of bridges under trains moving at different rates of speed, a correspondent assumes the position that the higher the speed the more safe the train. To illustrate his views, he compares a thin sheet of ice on a pond to a bridge; but I hold this to be a defective comparison, inapplicable to the conditions of the case. Ice is, to a certain extent, elastic, and is supported by the water over its whole extent; a bridge, on the other hand, is a solid structure, supporting itself from abutments. A sheet of ice 100 feet long, placed on abutments like a bridge, would tumble to pieces from its own weight. As the water supports fields of ice, there is a necessity for moving rapidly over it (when the sheet is thin) before the inertia of the water is overcome. This is the whole secret of safety in moving with a high velocity over a field of thin ice, and also over some bridges. If the rails on a bridge were allowed a springing action sufficient to compensate for the concussion, so that the places of support might not receive sudden shocks, it would be a safe structure to travel over at almost any rate of speed; while the reverse would be the case with a bridge of solidity, possessing no elasticity, and the parts of which were devoid of cohesion. Supposing a bridge was erected on pillars of sand, and a railroad train set gently, and perfectly balanced, upon it, the train would be supported with perfect safety while standing still. But if we take the same train and run it on to such a bridge at the speed of only a few miles per hour, the whole structure will topple down, span after span, like pins struck down by a rolling ball.

In passing over bridges, different kinds of motion have different effects upon the structure, and the same fabric that is adapted for rolling motion is not suitable for vibrating motion. A bridge which may be allowed to spring to permit a railroad train to pass over it in perfect safety, would tumble to pieces by an elephant running over it. The multiplied vibrations of the steps of the animal accumulate and concentrate to tear the structure to pieces; the rolling motion of the train, on the other hand, distributes the force and prevents their concentration.

It may be taken as a perfectly safe rule that a bridge which cannot stand under the weight of a train at rest, can under no circumstances bear a train when in motion. Railroad bridges should be of sufficient strength to sustain a load five times greater than that of any train which may pass over them; and if they are composed of wood, they should be renewed every five years. Were it practicable for trains to run on rails having a springing motion to compensate for concussions, such rails might be laid on a solid bridge and trains run over it at any velocity whatever with safety. T. S.

Philadelphia, Pa., Oct. 24, 1859.

COAL AND HEALTH.

During the season of summer, when the atmosphere is warm and balmy, the cheerful breezes have free scope to dance through all our apartments, and ventilation is effected upon natural and conclusive principles. The time, however, is at hand, with the approach of cold weather, when doors and windows must be closed to shut out the piercing wind, and when fires must be maintained in all dwellings to heat our sensitive frames. This is the season when means should be adopted for securing the requisite amount of the pure air of heaven, under all the circumstances of artificial heating, in every dwelling—public and private.

The importance of ventilation is generally recognized, as the evils that have been caused by dwelling in ill ventilated apartments have been set forth in various publications. There are some facts, however, connected with this question, which are not so well understood. Thus, many persons mistake warm for impure air; hence they do not make a distinction between the two, and do not seem satisfied that a room is habitable until they have expelled all the warm air from it. There can be no question, we believe, about the salubrity of warm dwellings in cold weather, if the air in them is only maintained in a pure condition. The circulation of air in a room is dependent upon the heat which is generated in fires, grates, stoves or heaters. The hot air expands, rises and seeks vent, and the cold air rushes in to supply its place. The grand secret of good ventilation, therefore, is a plentiful supply of fuel—an important fact too generally overlooked. The houses of the poor are kept close and ill-conditioned in cold weather, because the inmates cannot provide sufficient fuel for their wants. Coal is as much an article of life and health, in the winter season, as food, and yet how few think of this! In those churches, schools and other public buildings, where fuel is saved at the expense of an inefficient supply of fresh air, a cent-wise and dollar-foolish economy prevails; and this is the principle idea we wish to impress upon the public mind at this time. Arrangements for ventilation may be made in endless variety; but without an abundant supply of fuel, neither comfort nor proper ventilation will be secured. Fuel is to ventilation, in cold weather, what steam is to an engine—its governing power.

REMOVING MILDEW FROM CLOTHES.

When clothes are rolled up in a damp state for a few days, they become spotted with mildew, consisting of minute *fungi*. These are very difficult to remove, and they injure both the texture and color of the clothes. The only effectual method known to us for removing such spots from linen is by steeping the latter in a weak liquor of chloride of lime. It is made by obtaining some chloride of lime from the druggist's (say one pound), then stirring it into about four gallons of cold water. It is now allowed to settle for one hour and the clear liquor is ready for the clothes, which should be steeped in it for about two hours, then washed thoroughly in cold water, and exposed on the grass to the sun.

We have had several inquiries regarding the best method of removing mildew from clothes, and perhaps some of our lady readers (of which we have quite a respectable number) may be able to give us a more efficient and simple method than the one we have described. Much fine linen is often laid aside from use on account of becoming mildewed and discolored. A renovating remedy for this evil would be a great favor to many persons.

INDIA-RUBBER SOLVENT.

MESSRS. EDITORS.—I was somewhat amused by reading an article on the above-named subject, in your paper of Oct. 8th. Mr. S. W. Ells cannot be posted, though he would have been if he had had my experience, which is this:—About 12 years ago I undertook to dissolve some india-rubber in some turpentine, and succeeded very well. The rubber which I tried was a pair of old-fashioned overshoes, and I pretty effectually spoiled them by reducing them to a liquid form. My next operation was to daub the solution with a brush over a pair of fine calf boots, and the consequence was I spoiled them also; for it took them so long to dry, that the dust collected on them and could not be removed. To pay me for my trouble, I received a "most glorious thrashing" from my father, and thus ended my experiments in the india-rubber line. J. T. MIDDLETON.

Chicago, Ill., Oct. 18, 1859.