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O. D. MUNN, S. H. WALES, A. E. BEACH.

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Contents:

WANT OF AMERICAN OCEAN STEAMSHIPS.

Several years since (May 16, 1857, page 285 Vol. XII, SCIENTIFIC AMERICAN, old series,) we directed the attention of our shipowners and capitalists to the great increase of European steamers in the Atlantic trade, and we urged upon them the policy and necessity of engaging in the construction of screw propellers. We said "the longer they delay the weaker and less able will they become in the struggle, while their rivals will be growing stronger and stronger." Since that period we have on several occasions recurred to the subject, and have advocated the construction of iron screw propellers in preference to wooden vessels. On page 305 Vol. I (current series) we said: "We have lost, and are still losing, our ocean carrying-trade, principally from a class of steamers, the efficiency of which our people do not yet appreciate; we mean iron screw propellers." At that period we had three lines of American steamers engaged in the Atlantic trade, now we have not one. It is indeed true that our steamships which had been engaged in this commerce, are now employed by Government in necessary and important services, but it is none the less a subject of regret that the American ocean carrying-trade has been almost destroyed for want of fast steamers; for if we had a sufficient number of these they would bid defiance to the *Alabama* and all its congeners, and would have maintained our ocean trade in its integrity. The Boston merchants have been somewhat aroused to a sense of the importance of this question, and a company has been incorporated with legislative authority to raise a capital of two millions of dollars to establish steam navigation between Boston and Liverpool. A meeting was lately held for the purpose of devising measures to establish the line at once, and it was stated that the present means of communication between that port and Europe were totally inadequate to the wealth and importance of the city, as her imports reached her by other ports, and exports which could be shipped from Boston sought other channels. We believe that a line of steamships running between Boston and Liverpool could be sustained under good management. To this end a first-rate class of vessels must first be provided, and these must be afterward conducted with economy and ability.

As we anticipated ten years ago, screw steamers are fast driving sailing vessels from the ocean trade. In 1852, the tunnage of foreign-going steamers entered inward at Liverpool was 188, 715 tuns; in 1862, it was 595,339; in 1863 it has increased to 756,420 tuns. In about ten years the foreign steam trade of Liverpool has more than quadrupled. At present there are eight different lines of Atlantic steamships —all European—besides a considerable number of transient steamers. Six of these lines have contracts for carrying the mails, and in the aggregate they embrace fifty-five vessels; the Canada Company have lately made contracts with Clyde engineers to build three more new first-class iron screw propellers. Other companies have also entered into contracts for building several new steamers, as those which they now possess are inadequate to meet the demands made upon them. An important fact in connection with the success of these European steamers is, that with very few exceptions they are Clyde-built vessels. Even all the German steamers which trade between Europe and New York have been built on the river Clyde in Scotland, and several new vessels for these continental lines are now being constructed in the same quarter. Formerly all the Cunard steamers were wooden paddle-wheel vessels, but all those built for five or six years past are of iron, mostly screw propellers; and hereafter this class, we understand, will be preferred on account of their economy in fuel. These are important facts, worthy of the profound attention of our capitalists and shipowners, as several new lines of steamers are projected in England; and if these should succeed in engrossing more of our carrying-trade, it will be difficult, if not impossible, hereafter, to restore this branch of our commerce.

PHOTOGRAPHY AND PRINTING.

On several occasions recently, we have referred to the efforts which have been made in Europe to apply photography to the art of printing. A late number of the *Popular Science Review* affords abundant evidence of the satisfactory progress made in this art, as its frontispiece is embellished with a printed copy of a full page of the London *Times*, taken by the photographic process, and reduced to a space of four by five and a half inches. It is like a miracle of art to see six columns of that large newspaper copied by the power of sunlight and printed in such a manner, with every letter as distinct as if it had been traced with the point of a diamond. The advantages of an art by which copies of objects can be taken direct upon a lithographic stone or metal plate and employed for printing, are self-apparent; as, from one original, thousands of copies may be taken with the aid of a printing press. Fox Talbot, the inventor of photography, seems to have first published in 1853, a description of a process of photographic printing. A solution of gelatine, containing a little bichromate of potash, is poured upon a steel plate and allowed to dry. The object to be copied is interposed between the metal plate and sunlight, being laid upon a plate of glass that is pressed upon the metal plate. That portion of the gelatine which is exposed to the light on the plate becomes brown in color and insoluble, while those parts shaded from the light remain unchanged. When the metal plate is afterward placed in water, those portions of the gelatine not acted upon, are dissolved, while those which have been exposed to the light remain. By pouring nitric acid upon the plate, those parts from which the gelatine has been dissolved are etched, leaving the protected parts untouched. From such a plate copies may be taken in the common press employed for copper-plate printing. This process is imperfect, because it will not give the half-tints of pictures, although it will produce good copies of leaves and objects which have well-defined prominent lines. Mr. Talbot has made an improvement for producing the half-tints, but it is very difficult to manage. Another process has been brought forward by M. Pretsch. A metal plate, or one of glass is treated with gelatine and the bichromate of potash, in the same manner as has been described; this is exposed to light under a photograph or an engraving, and is afterward moistened with water but not washed, as in the Talbot method. The moisture causes the parts of the gelatine not acted upon by light to swell up above the other parts of the surface, and a mold in wax is then taken from the plate from which an electrotype in copper is taken for printing. This process is very effective for large prints, but is not suitable for producing fine delicate work. Another process is employed for producing copies of maps at the Ordnance Office, Southampton, England. The metal plate is prepared with gelatine and the bichromate of potash, in the same manner as described; a photograph of the map is then taken on glass, and pressed against the prepared plate, which is then exposed to the light. A roller charged with lithographic ink is passed over the face of the plate and its whole surface is blackened. After this the plate is soaked in warm water, when the soluble portions of the gelatinized surface are dissolved out, leaving behind the picture or copy in ink. This is now placed in contact with a smooth plate of zinc and submitted to heavy pressure, when the ink is transferred from the copy to the zinc plate, and from this with suitable preparation, copies may be printed in a lithographic press. This process has been very successfully applied to the copying of manuscripts and prints.

This art is still in its infancy, but we think it is ultimately destined to achieve great results. The prominent advantage of photography consists in its quick production of fac-similes, and this art combined with engraving and printing, by making the same chemical agencies which produce the picture prepare the plate for printing, possesses incalculable advantages. Copies of objects of natural history, rare engravings and manuscripts, are now taken by photography and printed; but the art is capable of still further improvement and a more extended application.

"BOSSES" AND WORKMEN.

As a theme for an essay, the relation of Labor to Capital, or the reverse, affords an opportunity for many finely-drawn theories concerning the duty of each. The real nature of the relations which should exist between labor and capital appear to us to consist in combining, as far as possible, the two interests, and making both work together for mutual advantage. Both are formidable, and exert an immense influence for good or evil. The injurious effect which capital can produce on the welfare of the community is well shown by the combinations which from time to time take place in certain branches of trade; where by the accumulation of large sums for specific purposes, speculators are enabled to force the market prices of articles far beyond their actual value. So also when capitalists coalesce for the purpose of cheating the laborer of his hire, by depressing wages below the standards of value, or so that the necessaries of life cannot be procured, another example is furnished of the unjust and general baneful effect which capital may produce on the people.

Labor is also exacting in its demands, at times, and when it fancies it has the sweep of the market, so to speak, takes advantage of the circumstance like other speculators, and in some instances is enabled to carry out its objects, in others not; depending principally upon the ability of Capital to withstand the demand made.

Now when we have two great forces given, the problem is—how to employ them to the best advantage. If a man builds double-cylinder engines he does not set them so that the power of one shall act against the other, but he connects both to the same shaft with the crank at right-angles, opens the throttle and away they go. Thus it should be with "bosses" and workmen; let each pull on the same shaft; each is a mighty force singly, but when their conjoint relations are deranged they shake the whole world. An earthquake does not exhibit more disastrous physical effects than do strikes or monopolies upon the social systems of civilized nations. Trades whose interests conflict with those of capitalists, or are made so to do by the perversity or shortsightedness of the members composing them, find that in the course of time their wages decrease instead of increase, and that their social standing is diminished. Some trades are afflicted with chronic strike, and appear to be at continual variance with their employers.

It may be in such cases that the wages are too small to live upon, or the want of harmony may proceed from other causes too complicated to be discussed at present; whatever the reason, it is certain that trades continually on the strike cannot get on, because the attention of the members composing them is turned from the trade to other subjects. Our sympathies are with the working classes, male and female, because capitalists are quite able to take care of themselves, and even if their business is destroyed can fall back upon other resources. But with the laborer no such course is possible; his capital is his hands and skill, and it is for this reason that we deplore strikes and the results which spring from them. These results are briefly—destitution of the strikers, bad feeling engendered between the bosses and men, and disorganization and derangement generally antagonistic to the best interests of the men themselves. There are doubtless times when trades are justified and compelled in self-defence to rebel against the terms offered by employers; but as a general rule labor is better