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**THE SCIENTIFIC AMERICAN SUPPLEMENT**

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## THE AMERICAN WAY.

One of the secrets of the variety and success of American manufactures is the readiness with which the manufacturers receive suggestions from their customers. If a buyer from a distance says that an article would better meet the wants of his locality if certain alterations were made, the American maker hastens to supply him with the thing he wants. Not unfrequently he will send a competent man to study the conditions of the distant region, that the required adaptation may be more certain and efficient, or an entirely new contrivance invented to supply the need.

In English and other European shops the man who wants something new constructed, or an alteration made in some standard article, is very apt to be snubbed. They have no time to waste on such experiments; and even if the new device should prove a slight improvement, they think it wouldn't pay to alter patterns and machinery to make it.

The result is, American manufacturers are not only monopolizing the home trade by the superior quality and fitness of their products to meet home wants, but by the same tactics they are gaining a permanent footing in foreign markets.

A characteristic illustration is furnished by a correspondent of the London *Times*, writing from Sydney, New South Wales. He says:

"It is a great thing to get control of the market, and the first thing is to get a good footing, and the Americans are certainly pushing for that with an energy which at least deserves success. Our railway department is putting together three large new locomotives from Philadelphia. Their design is the result of close personal observation of our precise wants by one of the partners in the firm of Baldwin & Co. I am not prepared to say whether these engines will prove in every respect better than those which we get from England, but I do not remember any English firm taking the same pains to study what we want to deal most successfully with—the steep gradients and sharp curves of our railway on the Blue Mountains. Perhaps it is not worth the while of the English makers to attend to such petty details, but the Americans think differently."

And, we may add, American manufacturers do not consider such details "petty." Tools and machinery are somewhat like animals and plants, in needing to be thoroughly adapted to their environment. The difference between an organism which thrives in England but will not in Australia, and one of the same genus which will thrive in Australia, may be inappreciable to the unskilled observer; but it is vital, and outweighs all the points of resemblance. So a machine, perfect from the standpoint of England or America, might fail utterly to meet the different needs of another region, though the alteration required to adapt it to the new conditions might be comparatively slight and easily perceived by an expert on the spot.

## THE PROPOSED PANAMA SHIP-RAILWAY.

The St. Louis *Exporter and Importer* has taken pains to get from several engineers of high standing an opinion as to the feasibility of the ship-railway project for the Isthmus of Darien, set forth in the communication of Captain Eads already placed before the readers of this paper.

Chief Engineer Chanute, of the Erie road, writes that he had already given considerable attention to the scheme, arriving at conclusions almost identical with those of Captain Eads as to its feasibility and general features. He would, however, double the number of wheels proposed for each cradle, so as to give an average load of five tons to each wheel, sustaining the cradle, ship, and machinery (say 10,000 tons in all) on 500 trucks of 4 wheels each. To carry these wheels he proposes eight parallel tracks, 13 feet between centers, or 96 feet over all; the cradle to be 500 feet long, 50 feet high, and 44 feet wide, with a total base of about 110 feet. Instead of the 500 foot turntables suggested by Captain Eads, Mr Chanute would make the turntable a part of the cradle by giving the trucks a transversing motion, at right angles to the axis of the cradle, sufficient to enable them to assume the proper position on the chord subtending the curves adopted, for a length equal to that of the cradle. Grades of one per cent would have to be adopted, and with a railway 60 miles long a steamer could be transferred from ocean to ocean in 12 hours by the employment of about 8,000 horse power. The cost of working should not be over one fourth of a cent a ton a mile, the weight of the vessel and cradle being included, or three fourths of a cent a ton a mile on its contents. Even at half the traffic estimated by the canal commission the road would pay handsomely.

Mr. C. Shaler Smith thought the only question in doubt was one of finance. Though a grand undertaking it would be by no means a difficult one, and the estimate of Captain Eads, $50,000,000, would fully cover the outlay. The enterprise would most undoubtedly pay. The tidal variation at Panama—20 to 25 feet—would make the handling of shipping there comparatively easy. At Aspinwall, with a tidal variation of about 18 inches, the entire lift would have to be made by supplied power. A caisson on an inclined plane would probably be the best form of lifting dock. He would hang the ship in the cradle in flexible slings composed of woven bands of steel wire rope, 5 feet wide and 1 inch thick. These slings would be connected with the cross heads of a number of hydrostatic presses placed along the cradle and connected by a pipe common to all, so that the ship would be always carried on an even keel, the same as though floating in a caisson. Ten parallel tracks, of 3 feet gauge, rails not less than 6 inches high, and tracks 10 feet apart, would be needed. This would give a total wheel base of 93 feet by, say, 460 feet for the largest cradle. Assuming a maximum load of 9,500 tons, 432 trucks, or 1,728 wheels, would be needed—a result substantially in accordance with that arrived at by Mr. Chanute.

As a method of supplying power for the transportation of the cradle, Mr. Smith suggests the Belgium wire rope towage system. If possible, level grades should be carried up to the base of the summit hills, and then by concentrating all the grades at one point the cradles could be moved over the summit by powerful stationary engines. If the summit can be passed, however, with a maximum grade of 20 feet per mile, then movable engines, drawing the cradles and themselves by steel wire towlines, laid in the middle of each track, and passing over and grasped by "Fowler clip pulleys" attached to each engine, will be the most economical method of locomotion in all probability. The power needed to transport the greatest load, with curves of 12,000 feet radius and grades of 20 feet per mile, would be 200,000 pounds, requiring steel ropes of 1½ inch diameter each. However, as these would form a costly part of the outfit, the relative economy between this system and that of the locomotive engine, for this peculiar service, can only be determined by exact calculations.

Mr. Henry Flad, C.E., writes that he has taken pains to inform himself in regard to the surveys and estimates for ship canals across the Isthmus, and has carefully estimated the cost of construction, maintenance, and operation of a ship railroad. Briefly stated, his opinion is as follows:

1. That the first cost of the construction of a ship railroad will not be one fourth of that of a ship canal.

2. That a ship railroad can be constructed in probably one third of the time required to construct a ship canal.

3. That ships can be transferred on such a railroad with absolute safety, and with the same dispatch as through a ship canal.

4. That the cost of maintenance will be less for the railroad than for the canal.

5. That although the cost of transferring ships by ship railroad will exceed that of passing them through a ship canal, the difference will be insignificant compared with the saving of interest on the first cost.

6. That the ship railroad will therefore offer a better and safer investment for capital.

The unanimity of these experienced and able engineers with regard to the feasibility and economy of a ship railway for the Isthmus is, to say the least, noteworthy and encouraging. Like all grand undertakings it presents an almost inexhaustible field for engineering skill and inventive talent; and it is gratifying to see that American engineers are so prompt to grapple with the novel difficulties presented.

## RECENT INDUSTRIAL PROGRESS.

Speaking of the revival of industry that has taken place since preparations for the resumption of specie payment were begun in the spring of 1877, Secretary Sherman said, in a recent speech:

In the production and manufacture of cotton the progress during the past four years has been unexampled, showing an increase of 30 per cent. The increase in the number of bales taken within the last two years over the two preceding years is 417,517, or more than 14 per cent. The present cotton year, ending in September, will show a more rapid rate of increase. The number of spindles has increased from 7,114,000 in 1870, to about 10,500,000 in 1878, an increase of over 47 per cent. The woolen manufacturing industry has recently received a strong impetus, which in a few weeks sent up the price of wool 20 per cent, and greatly encouraged the business of wool growing, and started many of the woolen manufactories that had been lying idle. The production of breadstuffs and meats has been enormously increased within the last year or two, and a ready market has been found for the surplus production. The net increase in pork packing is 38 per cent. The increase in beef production has been constant and progressive, stimulated by prices that have scarcely declined during the past two years. There has been a marked revival in the iron trade during the last two years. In 1873 the production of pig iron in this country reached its maximum, amounting to 2,868,278 tons. Under the influence of the panic it fell off to 2,093,236 tons in 1876. In 1877 it increased to 2,314,585 tons, and in 1878 to 2,577,361 tons. This year, it is believed, the production of iron will be as great as that of the most prosperous year in the history of this product.

### The Yellow Fever.

The steady progress of the epidemic in Memphis has been less startling than last year, but for all that, sure and fatal. From 20 to 30 new cases daily, in a town so depopulated as Memphis now is, and where of those that remain so many are protected by previous attacks, is indicative of a potent and concentrated infection. Of other towns, Corinth, Miss., has had one or two cases. Mayersville, Miss., is also reported as suffering. It has been very properly decided to continue perfecting the system of isolation of Memphis, under the rules of the National Board of Health, which have already given such good results, to use every possible means to induce the negroes, who constitute the main source of danger in Memphis, to move into camps, and thus deprive the fever of material to work on; to secure the isolation of cases and affected houses, blocks, and districts, and to effect this by combining as far as possible the resources of local, State, and national boards with those of the Howard Association and of the taxing district and county authorities, and thus limit the spread of the disease.