

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park-row (Park Building), New York.

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TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months. Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada. Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

See Prospectus on last page. No Traveling Agents employed.

VOL. I., No. 11.....[NEW SERIES.].....Fifteenth Year

NEW YORK, SATURDAY, SEPTEMBER 10, 1859.

CITY RAILROAD IMPROVEMENTS.



IMPROVEMENTS for propelling cars upon city railroads seem to be imperatively demanded. On the several lines in New York, Philadelphia, and other cities, all the cars are either drawn by horses or mules, and each company requires a horde of these animals to do the necessary work. As their sinews can only be kept in motion for a very limited period of time, a great number of relay teams must always be maintained, thus involving a vast expenditure. The proprietors of these lines would gladly avail themselves of a more economical substitute for animal power, and it is to this new field for improvement we wish to direct public attention by some brief considerations.

To show how anxious some of these railroad companies in New York are to obtain a new motive agency, we have only to state that one of them has been engaged for some months in making experiments and efforts to apply a spring-power to one of their cars. It consists in the application of coiled springs to the axles, which are operated by such an arrangement that they exert their tension force when uncoiling to revolve the wheels; and while one spring is actuating an axle, the other is being wound-up for keeping the car in motion. It has been asserted that, with the labor of one man for coiling up the springs, a car can be moved as easily as with two horses. Such an expectation is preposterous, because no more power can be exerted by the springs than that which is applied to coil them. This project, however, affords good evidence of the readiness with which a new substitute for horses is taken up, for the purpose of abolishing their employment entirely. We commend the spirit of the company which has been making these efforts; because a spring-power, even if it were more expensive than that of animals, is preferable, for much cruelty to the dumb brutes would thereby be abolished.

We have also noticed that a peculiar class of steam-engines has been proposed in the columns of our Philadelphia cotemporaries, by Mr. Thomas E. McNeil, whose proposition has been highly commended. The engine is described as direct-acting, with horizontal cylinders, a vertical boiler, and a condenser to obviate the noise of the exhaust blast in the chimney. The *Ledger* states that "it is designed to box up the machine so as to present the appearance of an ordinary car, with a small chimney like a stove-pipe. Built upon the plan proposed, the engine will occupy about the same space as the horses. The cars can be heated by steam in the winter, and cooled by a fan in the summer. Another advantage claimed for steam over horses is, that there will not be any dust, and that it can be more easily managed, the cars being stopped in less time. The engine can be applied to the cars now in use, and will, with ease, ascend any of the grades in the city." It is claimed that, on the score of economy, steam has a decided advantage over horses, costing from one-third to one-half less." Such engines may operate very well, but they are not new, although we have no doubt they are original with the inventor who now proposes them. Several years ago either one or two of such engines were constructed by Mr. Henry Waterman, of Brooklyn, at Matteawan, N. Y., for the

Hudson River Railroad Company, to draw their cars through this city, and they were described in one of our former volumes. It was stated that they fulfilled all the conditions for which they were engaged, but for some reason (unknown to us) they were only used for a very brief period.

There is a strong prejudice existing in the minds of our citizens against the use of steam-engines running in the streets; hence not only the city railroads proper, but all lines which converge here (and it is the same in other cities), have to unharness their iron horses at the corporation precincts, and use animals to perform the rest of the journey. The vast extra expense incurred by this mixed system of railroad conveyance stamps it at once as being either behind the intelligence or the engineering skill of the age. For our own part, we know that steam locomotives can be constructed to operate with as much safety and with far more economy than horses in drawing city cars, and the popular prejudices against them we hold to be groundless. An engine with a tubular boiler six feet long and three feet in diameter, carrying 50 lbs. of steam, with cylinders only six inches in diameter and ten inches in stroke—making 200 revolutions per minute—will do as much work as five horses, and occupy no more room in the street than one animal. It can be as easily controlled as an infant, and a very limited number of such motors could supply the place of a great number of horses, because iron sinews "never tire" like those of animals; hence a crowd of relays would not be required. Turn-tables at the ends of the tracks can be set in the ground for turning round, and every arrangement necessary for perfect operation can be provided to insure success. We, however, do not propose any specific plan, but we perceive that some new improvement is wanted as a substitute for the whole of this animal barbarism on city railroads; and that either steam, hot air or electro-magnetic motors are preferable. This is a question which should and must be agitated until a complete reform is achieved.

INDIA-RUBBER INTERESTS OF THE UNITED STATES.

With this number of the SCIENTIFIC AMERICAN we publish an elaborate illustrated description of one of the great india-rubber manufacturing companies of the country—the "New York Belting and Packing Company;" also some details of the life and discoveries of the inventor of vulcanized rubber, Charles Goodyear. The warehouse of this company is at Nos. 37 and 38 Park-row, next door to the entrance of the SCIENTIFIC AMERICAN office. A visit to this warehouse must impress any one with astonishment at the wonderful growth of this comparatively new manufacture. Here is to be seen a varied assortment of the three staples of the company's manufacture—Belting, Packing and Hose; belts from one inch to 36 inches in width, and of any length and thickness desired; packing from 1-32 of an inch to two inches in thickness, and of numerous forms, for man-hole and hand-hole plates, steam-chests, steam valves for marine and other engines, stuffing-boxes, &c., &c.; hose from a half inch to four inches in diameter, and in thickness from the thin two-ply up to the six-ply for steam fire-engines, which is subjected to a strain that no leather will sustain.

The company inform us that these articles have already gone into use to a surprising extent; that some of the leading manufacturers of threshing machines use 50,000 feet of belting a year; that nearly 300,000 feet (more than 50 miles) of belting are used in a year for cotton gins; and that the rubber hose is now in general use throughout the country, upon hydrants, force-pumps, steam fire-engines, &c.

One curious article of manufacture, in contrast with this company's staples, is Phelan's patent cushion for billiard tables. These are made soft at the back and hard on the edge, so as to cause the ball to rebound at the proper angle.

We remember the time when all the india-rubber that we knew anything about consisted of the little pieces with which we erased pencil marks: and now its manufacture is a vast interest, woven in a thousand ways into the life and business of the people. When we contemplate a growth so marvelous, we wonder what new manufactures and arts, at present undreamed of, the next 40 years of this country will develop.

In our next week's issue we shall take up, briefly, the

subject of *hard* rubber, and enumerate the multifarious arts to which it is now applied.

THE ELECTRIC ART APPLIED TO PRINTING.

After a successful publication of the SCIENTIFIC AMERICAN for 14 years, we commenced a new series on the first of July last, having every number electrotyped, so that, in future years, back numbers and volumes might be supplied. After we began to publish the new series, the increased demand so far surpassed our own expectations that, before the eighth issue appeared, we had to furnish two extra editions of several preceding numbers. When the art of electrotyping was first so far improved as to come into practical use, we published a series of interesting articles on the subject. Little did we expect, however, at the time, ever to be benefited by this beautiful art in our business. This paper is now regularly printed from the copper-plates of the electrotypist; and while one number is in process of being printed, the types from which the mold was taken are in the hands of the compositors, in preparation for the next impression. Thus, week after week, the matter is set up and electrotyped, the paper printed, folded, put in wrappers and mailed, giving employment, in these departments alone, to more than 30 persons.

In England, and on the continent of Europe, there are a number of monthly publications devoted to mechanics, inventions and science; but there are not, in all Europe, six weekly papers of this character, and the subscription price of those that are published, owing to their limited circulation, is more than three times the cost of the SCIENTIFIC AMERICAN. Will all who take an interest in the history and progress of mechanism, science, or invention, consider (if they are not already among our subscribers) how cheaply they can procure a weekly journal devoted to these subjects, and, if they are satisfied that it will be a good investment, send us \$2.00 for a year's subscription? The numbers for a year contain over 830 pages, and more than 600 original engravings of new inventions and machines, all made expressly for this paper. At the end of every six months, an index and title-page are furnished, so as to make the work complete for binding. We do say, without fear of contradiction, that no other work containing so large an amount of valuable and interesting information, can be purchased at the same cost.

In the prospectus, on the last page of this paper, the character of the publication is fully set forth, and the terms, for single subscribers and for clubs, are given in detail. To this prospectus we respectfully call the attention of those readers of the present number who may chance to fall in with it, who are not our regular patrons.

CROWDED STREETS.—We often justly complain of the overcrowded state of the principal business streets in our city, especially Broadway; and to obviate this evil, suspension railroads and subterranean railroads have been proposed by several inventors, many plans of which have been illustrated in our columns. The police do their best to prevent obstruction to constant travel; but, in spite of all their efforts, carts, carriages and stages frequently get blocked up in such solid ranks that they cannot pass one another for long intervals of time. We think that things must be managed in a rather superior manner by the London police, or it would be impossible for the vast number of vehicles which crowd into that city to pass over the bridges. From a report recently published, we learn that 20,498 vehicles and 107,000 foot passengers pass over London bridge every 24 hours.

AN APPRECIATING PATRON.—In our advertising columns appears an advertisement for a single volume of the SCIENTIFIC AMERICAN, for which the advertiser offers ten dollars. We hope there are none of our readers who are inclined to dispose of their volumes at even ten dollars each, but if there be any such who possess Vol. I, we trust they will address Mr. Nettle, at Albany, N. Y. We would take occasion to remark in connection with the above, that the price now offered for a single year's numbers of the SCIENTIFIC AMERICAN would pay, at our club prices, for seven years' subscription in advance, thus proving that, in a pecuniary sense, an investment in the SCIENTIFIC AMERICAN is "better than investing in a savings-bank," as our correspondent, J. R. G., of Louisville, Ky., testifies by relating a pleasant incident in our last week's issue.