Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, for the U. S., Canada or Mexico.....$3 00
One copy, six months, for the U. S., Canada or Mexico..... 1 50
One copy, one year, to any foreign country belonging to Postal Union. 4 00

Remit by postal or express money order, or by bank draft or check.
MUNN & CO., 361 Broadway, corner of Franklin Street, New York.

The Scientific American Supplement.

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, $5.00 a year, for the U. S., Canada or Mexico. $6.00 a year to foreign countries belonging to the Postal Union. Single copies, 10 cents. Sold by all newsdealers throughout the country. See prospectus, last page.

Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, to any address in U. S., Canada or Mexico, on receipt of *seven dollars*. To foreign countries within Postal Union, *nine dollars a year.*

Building Edition.

THE ARCHITECTS AND BUILDERS EDITION OF THE SCIENTIFIC AMERICAN is a large and splendid illustrated periodical, issued monthly, containing floor plans, perspective views, and sheets of constructive details, pertaining to modern architecture. Each number is illustrated with beautiful plates, showing desirable dwellings, public buildings and architectural work in great variety. To builders and all who contemplate building this work is invaluable. Has the largest circulation of any architectural publication in the world.

Single copies 25 cents. By mail, to any part of the United States, Canada or Mexico, $2.50 a year. To foreign Postal Union countries, $3.00 a year. Combined rate for BUILDING EDITION with SCIENTIFIC AMERICAN, $5.00 a year; combined rate for BUILDING EDITION, SCIENTIFIC AMERICAN and SUPPLEMENT, $9.00 a year. To foreign countries, $11.50 a year.

Spanish Edition of the Scientific American.

LA AMERICA CIENTIFICA E INDUSTRIAL (Spanish trade edition of the SCIENTIFIC AMERICAN) is published monthly, uniform in size and typography with the SCIENTIFIC AMERICAN. Every number of *La America* is profusely illustrated. It is the finest scientific, industrial trade paper printed in the Spanish language. It circulates throughout Cuba, the West Indies, Mexico Central and South America, Spain and Spanish possessions—wherever the Spanish language is spoken. $3.00 a year, post paid to any part of the world. Single copies 25 cents. See prospectus.

MUNN & CO., Publishers,
361 Broadway, New York.

☞ The safest way to remit is by postal order, express money order, draft or bank check. Make all remittances payable to order of MUNN & CO.

☞ Readers are specially requested to notify the publishers in case of any failure delay, or irregularity in receipt of papers.

NEW YORK, SATURDAY, OCTOBER 17, 1891.

Contents.

(Illustrated articles are marked with an asterisk.)

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 824.

For the Week Ending October 17, 1891.

Price 10 cents. For sale by all newsdealers

THE SHIPS WE WANT NOT THE KIND WE ARE GETTING.

The statements made by Secretary Tracy respecting the future necessities of the navy and the announcement that his forthcoming report will recommend that no more unarmored cruisers like those of the white squadron be constructed have aroused much interest among naval officers. The Secretary is reported as saying:

"We need three distinct classes of ships. First, battle ships such as the Massachusetts, Indiana, and Oregon will be when completed; second, fleet commerce destroyers like the New York; and third, a large number of small thousand-ton vessels for police purposes. Our battle ships can fight anything afloat. There is nothing in the English, French, or Italian navies that they cannot fight. As a matter of fact, the number of vessels in any of the foregoing navies that could successfully oppose them are comparatively few. With a dozen such vessels added to our monitors for harbor defenses, we could in our own waters successfully withstand an attack from Great Britain herself. The New York is an armored cruiser. She is now building at Cramps' yard at Philadelphia at a cost to the government of $3,000,000. Her purpose is to destroy an enemy's commerce. Four such ships distributed in various quarters would put an effectual stop to the depredation of as many fleets of ordinary cruisers. She will have, in many respects, a wider field of usefulness than any other ship yet designed for the navy."

Small cruisers for police purposes, the Secretary says, can be quickly constructed. Their crews are small, they burn little fuel, and their cost, exclusive of armament, is only a trifle in excess of $300,000 each. "For ordinary police purposes," said Secretary Tracy, "they will be quite as effective as any of the heavier cruisers. They carry eight 4-inch rifles and a small subsidiary battery of rapid-fire guns. Where difficulties arise with small countries like Hayti, San Salvador, and Nicaragua, which have no navy, such vessels fill every requirement, while the expense of maintaining them afloat is trifling as compared with that of the larger ships. At this time, too, we could use them in China."

If the recommendations in Secretary of the Navy Tracy's forthcoming report are carried out, we are likely to expend a large sum of money on what we don't want and unnecessarily to postpone the building of the type of ship we shall be in most pressing need of when we need any. The great battleship of the Massachusetts type, in which he seems to repose so much confidence, would not, in all probability, have anything to battle with in case of war, unless the enemy should commit the folly of taking to the high seas to meet her. The best thing the enemy could do would be to leave her alone, for she could do no harm, unless coming up with something as slow and cumbersome as herself, in which case she would be only doing the enemy a service to sink it. And what would such enterprises avail if the enemy was plying his ocean trade unmolested? The purpose of deep-sea fighting heretofore was to prevent interference with commerce. But the most important commerce to-day is carried on in fast steamers, and in case of war would, in all probability, be confined to this character of craft, which, it may be said, is being more powerfully engined year by year. What hope would there be of intercepting it by such weighted-down and unwieldly warships as the coming Massachusetts, Indiana, and Oregon? As for depredations on an enemy's coast, the present superiority of the land gun over the marine target has rendered such impracticable. Thus the Secretary's declaration that these ships "can fight anything afloat," even if true, is without important significance.

Let us now consider the commerce destroyer New York, now building at Cramps' yard, and of which the Secretary says: "Four such ships distributed in various quarters would put an effectual stop to the depredations of as many fleets of ordinary cruisers." Perhaps they could. But how about the enemy's fast merchant fleet; could they overhaul it? There are at least four merchant steamers at present in the Atlantic trade that, even with heavy cargoes, are good for 21½ knots, and which with lighter cargoes can undoubtedly do better than this. The guaranteed speed at sea of the new Cunard steamers, contracts for which are reported as having been given, recently, to the Fairfield Co., is to be 22 knots per hour. Each boat 12,000 tons. Will the New York be up to this? We hope so, but the experience with our other new ships leaves room for serious doubt.

As to the "large number of small thousand ton craft with small batteries to do police duty and cost $300,000 each," which the Secretary would build, it is clear that they would be too weak to fight and too slow to run away. It is evident that our most pressing need is a fleet of commerce destroyers, fast enough to overhaul the fleetest craft afloat. During the civil war three swift steamers, the Alabama, Georgia and Florida, were the means of driving our great merchant fleet from the seas. These ships could come up to anything we had afloat, and in order successfully to play a similar role in a coming war, ships to do such work must have a like recommendation. The navy engineers, accounting for the lack of speed of those of our new ships that promised to be so swift, declare it impossible to get maximum speed out of engines unless they are constantly kept up to it, that is to say, constantly driven at full speed; the stokering maintained at maximum efficiency, the engineers experienced in meeting obstacles and correcting defects.

If this is the case, and no one can deny the reasonableness of it, the answer is that the thing should be done. Ships of the commerce destroyer class should, like the swift passenger vessels, be kept driving away at full speed in time of peace, to be prepared to perform their proper service with precision if war should come. Those who read the orders as they come from the navy office are aware that ships are constantly being sent to call at foreign stations, and it is a fact that in all the regular squadrons, North Atlantic, South Atlantic, Pacific, European, and Asiatic, the regular order is cruising over an extended track. Thus a long cruising ground could readily be selected for such craft as commerce destroyers, when they were not employed for emergency calls to far-away stations, and instead of burning 75 or 100 tons of coal per working day with two-thirds speed, they might be allowed 200 tons, or enough to drive them always at maximum speed.

Fast craft we want if we want any, and if the only means of keeping them fast is by constant pushing, let them be pushed for all that is in them.

ELECTRICAL TRANSMISSION OF 300 HORSE POWER.

If it is true, as cabled, that 300 h. p. gathered from the river Neckar is being delivered at the Frankfort exposition, 108 miles distant, in the form of electrical energy and with a loss of only 25 per cent, it is an event of uncommon importance and is likely to awaken as much interest in other parts of the world as at the chief city on the Main. It is more likely that there is some exaggeration in this statement, and yet the presence of many expert electricians and the remarkable care and cunning with which the transmitting apparatus has been set up and operated leaves room for the hope that an important advance in the science of transmitting large parcels of power has been attained. We are told that the power is obtained from a turbine placed in the channel of the Neckar at Lauffen, driving a rotation current dynamo which converts the energy into the form of a combination of alternating currents. These currents are next transformed into a current of high pressure and small strength. It is transmitted through three thin bare copper wires of no more than four mm. diameter. These are strung along ordinary telegraph poles. The line passes through Heilbronn, Jagstfeld, Eberbach, Erbach, Babenhausen, Hanau. At the exposition this current feeds 1,200 incandescent lights, runs a powerful rotation current motor, a number of smaller motors, a centrifugal pump supplying a waterfall 10 meters high and much other power-consuming apparatus.

We are not told how the operators have overcome the influence of that potent disturbance, the Foucault currents, which, from the time of Marcel Deprez's experiments at the railway shops of the Chemin de Fer du Nord in Paris down to the present time, have rendered futile all attempts at the economical transmission of large parcels of electricity over a long line. One hundred miles is a long distance to transmit 300 h. p. less 25 per cent, and if actually accomplished, it leaves a strong hope that both the load and distance may be gradually increased till finally the prophesy Sir William Thomson uttered at Niagara will have been fulfilled and vast quantities of power gathered at the great falls will be transmitted in the shape of electrical energy to operate mills and workshops and railways hundreds of miles away.

A NEW EDISON ELECTRO-MOTOR.

Mr. Edison, if correctly reported, has constructed a novel electro-motor or made important improvements in the present type—he is not yet prepared to say which—and because of this discovery declares that electrical traction will drive out all other forms, at least for city passenger traffic. Moreover, he says that the Broadway and the Third Avenue car companies will soon have cause to regret their enormous expenditures for cable roads, for that his new system could be installed by simple and readily accomplished changes in the roadbed. This will prove as melancholy news to Broadway merchants as to the companies, for if true, the long-continued and, indeed, not yet expired term of inconvenience and confusion might have been avoided.

Many who have watched the introduction and progress of the overhead trolley system were long since convinced that it would not prove a permanent form of traction. Too many parts of the apparatus are left exposed to the weather and other conditions unfavorable to reliable working, and though important improvements in economic apparatus are constantly being made, and running expenses have been declared by competent authority to be less per car mile than in