

# Scientific American.

ESTABLISHED 1845.

MUNN & CO., EDITORS AND PROPRIETORS.  
PUBLISHED WEEKLY AT  
No. 361 BROADWAY, NEW YORK.

## TERMS TO SUBSCRIBERS.

One copy, one year, for the United States, Canada, or Mexico ..... \$3.00  
One copy, one year, to any foreign country, postage prepaid, £0 16s. 5d. 4.00

## THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (Established 1845) ..... \$3.00 a year.  
Scientific American Supplement (Established 1876) ..... 5.00 "  
Scientific American Building Edition (Established 1885) ..... 2.50 "  
Scientific American Export Edition (Established 1873) ..... 3.00 "

The combined subscription rates and rates to foreign countries will be furnished upon application.

Remit by postal or express money order, or by bank draft or check.

MUNN & CO., 361 Broadway, corner Franklin Street, New York.

NEW YORK, SATURDAY, APRIL 22, 1899.

## THE THIN END OF THE WEDGE.

Englishmen and Americans alike have been quick to realize the significance of the recent placing of orders in this country by England for locomotives and bridge work.

Outside of their splendid shipyards, there are probably no industrial establishments in which the English take greater or more justifiable pride than in the great locomotive shops from which the railroad system of England has been hitherto exclusively supplied with its motive power. To have first one and then another of its great trunk roads place an order for a score of first-class locomotives with a foreign firm has, therefore, produced a degree of surprise and misgiving which no subsequent explanations by the directors have been able to allay. The suspicion that foreign invasion of exclusive markets had commenced in earnest was deepened into conviction when, a few weeks later, the British government awarded to an American firm the contract for a bridge to be built on the line of the new railroad in the Soudan.

It is not enough to say that the sending of these orders abroad was due to the fact that English firms are crowded with work, some of which represents long-standing orders that were delayed by the great engineering strike, the rest being due to the remarkable era of prosperity in that country. This may have been the occasion, but it is not the cause. The cause lies deeper than any accidental shortage of locomotives on an English road or the military exigencies of the Soudan campaign. These may have hastened the insertion of the thin end of the wedge of competition, but they are not to be mistaken for the power which day by day will drive it home. The strength of American competition lies in the quality and low cost of our finished product, and in our ability and willingness to adapt it to the needs of the buyer, and to deliver it to him in so much less time than our competitors.

At the same time our success in foreign markets is not due merely to the fact that in many lines we can undersell our competitors. It was not the fact that our locomotives are from \$2,000 to \$3,000 cheaper than the English locomotives or that the Soudan bridge could be delivered at so many cents a pound less by an American firm that brought the orders here. We won those contracts because of our ability to promise prompt and early delivery, and this element of speed is only one among several which will give us a commanding position in every market of the world before many years pass by. The secrets of our success may be summed up categorically as follows:

1. We study the wants of each particular market and try to accommodate our products to the needs of the purchaser. On the other hand the English manufacturers demand that the market shall accommodate itself to the goods.

2. The design, manufacture, and finish of our commodities are governed by considerations of utility first and last. The finished article, whether it be a lock or a locomotive, must be pre-eminently useful. It must do its work quickly, and with the least possible care and expense to the user. If we secure these features of handiness and durability in the highest degree, we care very little how cheap a material is used, or how small an amount of finish for mere appearance sake is put upon the finished article. We realized long ago that cheap cost is not synonymous with weakness, nor mere weight with strength, nor polish with practical utility. We substitute wood for iron, cast iron for steel, and steel for the costly alloys when we are once satisfied that the cheaper material will serve the purpose equally well.

3. Capital and labor in America are both agreed that there is mutual profit in the substitution of the machine for the man wherever it is possible. Automatic and semi-automatic machinery cheapens the product, increases the demand, and so gives employment to five men for every one that it displaces. In England the operative, misled by the pernicious teachings of the trades unions, believes that the introduction of the labor-saving machine means the extinction of the mechanic. The result is that, while his American brother gets all he can, the English operative gets the least he can, out of the automatic machine.

If we were asked to name the cause which above all others is contributing to our success, we would point to the foregoing.

4. Our manufacturers realize the important economies which result from thoroughly systematized management. The clerical force, the draughting offices, and the shops are organized with a careful attention to detail, and are run in many cases with a strictness of discipline which is military in its order and method, and more than military in its accomplished results. The work is highly specialized, and its progress through the shops from the raw material to the finished product is so arranged as to avoid delay and enable it to pass from bench to bench and from department to department with the least amount of rehandling.

5. While our manufacturers aim to meet the demands of particular localities, they endeavor, as far as possible, to standardize their work, with a view to building for stock and keeping a surplus on hand to meet a sudden demand. We have carried this practice into fields in which our European competitors have never attempted to apply it. There is no valid reason why locomotives and (in the smaller sizes) bridges should not be sold out of stock, as well as lathes, reaping machines, or bicycles. They vary in size, shape, and capacity, and in proportion as the trade of our great industrial establishments extends, the risk of keeping such costly material in stock is lessened, while its value from a competitive point of view is immeasurable.

One of the English firms whose bid on the Soudan bridge was rejected on the ground of delay, declared that only a bridge-building firm that kept bridges in stock could guarantee delivery in the time proposed by the successful American firm. While this is not true, our excellent system of building to standard designs and with standard shapes gives us an unquestionable advantage in competitive bidding.

The performance of these American locomotives on the Midland and Great Northern railways will be watched with keen interest by the English master mechanics, or locomotive superintendents, as they are called over there. If they are only approximately as economical in fuel and durable under hard service as English locomotives of equal hauling power, their cheap cost and the rapidity with which they can be delivered will either make them the pioneers of many more to follow, or produce a radical change in the appearance and cost of the home-made English locomotives.

## ECHOES OF THE WINDSOR HOTEL FIRE.

It is characteristic of the rush and ready forgetfulness of the times that the horrors of the Windsor Hotel fire should already have ceased to occupy the public mind. There are three or four thousand guests in similar fire traps (there are many of them) in this city, who are living contentedly in brick and timber hotels that would probably immolate a large proportion of their inmates if they should once become well ablaze by day or by night. It is impossible to believe that these people are conscious of the hourly risk they run, or the simplest instincts of self-preservation would cause an early emigration to the modern fireproof buildings, which, while they might not live fully up to their name, would at least be so far slow-burning as to afford time for the escape of the guests.

But although the inmates of these older hotels may have forgotten the awful object-lesson of the Windsor fire, there are others, such as the hotel proprietors and the members of the fire and building departments, who do not forget, and surely will not be so criminal as to ignore this latest warning. If "the life of a man is worth more than that of a sheep," we shall surely see some early steps taken to protect the inmates of the many non-fireproof hotels referred to. The least that can be done is to provide some speedy and reliable means of escape from the building, for it may as well be taken for granted at once that a six or eight story hotel with hollow wooden floors opening into hollow wooden partitions, when once ablaze, will burn like kindling wood or a Fourth of July tar barrel.

The late fire has shown once more the inadequacy of the stereotyped means of escape. It takes an athlete to descend a rope, and the aged and sick are helpless on balconies and fire escapes; internal stairways and elevator shafts are so many great flues impassable for smoke, if not for flame; and smoke and fire belching from outside windows frequently render the ordinary outside fire escape impassable. It is probable that more victims are overcome by smoke than by flames. It is the all-pervading smoke that so quickly renders useless the various means of escape both within and without the building.

What is needed is some independent stairway or elevator shaft, external to the building, and having no direct connection with the building through which fire and smoke can enter. This emergency shaft could be built either within or outside of the main walls of the building, provided that the openings at the different floors led out on to balconies on the outside of the building and there was from cellar to roof absolutely no direct opening from the building to the shaft. If this shaft were constructed of fireproof brick and with

hollow walls, the elevators and stairways within it could be used even while the interior of the building was a seething furnace. At each floor there should be a door through the side walls of the building, if the shaft were on the inside, or through the wall of the shaft remote from the building, if it were on the outside, each door leading onto a balcony communicating with each of the rooms or passageways on that side of the house. In the case of new buildings, the designs should be so drawn that the walls in the immediate neighborhood of the emergency shaft should be windowless. At the ground floor a fireproof passageway should communicate directly with the street.

Now, with regard to the older fire-trap hotels existing in this and other cities, it is evident that these fire-escape shafts could now be built against the rear walls in positions where they would not mar the architectural appearance of the buildings. Two such additions to the Windsor Hotel, with connecting balconies on three sides at every floor, would probably have enabled every victim that was shut out by fire and smoke from the interior elevators and stairways to escape. There is certainly every reason why shafts should be built against the rear walls of every important hotel of the older class and the necessary connecting balconies added.

It is true the inconvenience and cost would be considerable, and the balconies would be somewhat unsightly—though it would not be necessary to use them on the main front—but we have yet to learn that the buildings in question have so much architectural beauty that an iron balcony more or less would materially alter the effect.

We commend this suggestion, which comes to us from Mr. C. Baillairge, a civil engineer of Quebec, who has devoted many years to the advocacy of better means of escape from fire, to the notice of the building and fire departments of this city. If "the life of a man is worth more than that of a sheep"—which many people seem to doubt—it is surely well worth while to enforce the erection of this, or, if such can be found, some better way of escape from fire, in connection with the older hotels with which our large cities abound.

## NAMING THE NEW WARSHIPS.

The warships authorized by the recent naval appropriation bill have been named by the Secretary of the Navy as follows: The three battleships, which are to be of 13,500 tons displacement and 18½ knots speed, are to be known as the "Pennsylvania," the "New Jersey" and the "Georgia"; the 12,000-ton cruisers will bear the names of "West Virginia," "Nebraska," and "California," while the six 3,000-ton protected cruisers will be known as the "Denver," "Des Moines," "Chattanooga," "Galveston," "Tacoma," and "Cleveland."

It is provided by law that the battleships shall be called after States, and the cruisers after towns. It was in accordance with this provision that our first two armored cruisers, the "Brooklyn" and the "New York," were named after cities; but it will be noticed that the new cruisers of this class are to take the names of States. This is more agreeable to the size and fighting power of these vessels, which actually have more in common with the battleship than with the cruiser. It is certainly proper that the names carried by our warships should be representative of their size and importance, and the trend of later designs shows that the battleship and the cruiser are destined before long to merge into a common type.

In this connection we think the selection of the names of States for the three little monitors "Florida," "Wyoming," and "Connecticut" is greatly to be regretted, particularly in view of the fact that giving the names of States to armored cruisers as well as to battleships will so much the sooner exhaust the list of available names, of which twenty-one out of a total of forty-five have already been appropriated. It would have been better, we think, to have named our monitors after famous admirals, particularly as there is a historical fitness in giving the names of Farragut, Porter, and others of their day to a type which originated in the stirring times which made these men famous; but inasmuch as these names have been given to the torpedo boats, would it not be well to continue to name this class after famous Indian chieftains or tribes, as was done in the case of the early monitors? Such names as Miantonomoh, Monadnock, and Canonicus appeal to us both for their euphony and strong historic interest.

## A RECORD TORPEDO BOAT TRIAL.

The builders of the new cup challenger, the "Shamrock," have just completed a torpedo boat which has broken all records for an official trial trip by making a speed of 33 knots an hour. The "Albatross" is one of five sister vessels completing for the British government, whose contract speed is set down at 32 knots. She is of 360 tons displacement and her engines are designed to develop 7,500 horse power. In our own navy the vessel that most approximates to her is the torpedo boat "Stringham," of 340 tons displacement, 7,200 horse power, and an estimated speed of 30 knots. Thirty-three knots, while it is the highest speed attained at