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 1878) ..... 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, AUGUST 26, 1899.

THE PROBLEM OF THE NEW CRUISERS.

So serious do we consider the proposal to provide our six new cruisers with the very low speed of 16½ knots and a deck that is only partially protected, that we shall take up this question again in our next issue and present further facts and an illustration of the proposed ships which is being prepared from the official drawing. We take this opportunity of drawing attention to the fact that the proposed displacement of 3,400 tons for these ships as given in the comparative table published in our last issue has been raised to 3,500 tons and should so read in the table. Starting with a displacement of 2,500 tons, as authorized by Congress, the maximum displacement was raised first to 3,400 and finally to 3,500 tons.

THE STRATFORD TROLLEY DISASTER.

In our last week's issue we gave illustrations of the bridge at Stratford, Conn., and an outline of a plan showing how the accident might have been prevented.

We note that the verdict of the coroner's jury, which was rendered on the 17th inst., confirms our view of the matter; first, that by reason of the rapid running of the car and the defective condition of the approach adjoining the bridge, the car was derailed; second, that the stringer or guard rail outside of the track, although of the style generally used on all railroad bridges, was not effective in this case by reason of the speed and momentum of the car; third, that the car approached the bridge at a dangerous rate of speed; fourth, that the motorman was guilty of criminal carelessness in running the car at such high speed.

The Shelton Street Railway Company is found very negligent in allowing the track to be insufficiently filled in and supported by earth near the bridge abutment, and in view of such condition to neglect to have a constant, all-day inspection. The jury also recommends:

First, that all cars be required to stop before crossing the bridge 30 feet distant from either end of the bridge.

Second, that all trolley bridges have inside guard rails and that the outside guard rail be not less than 8 inches high and be lined with iron.

Third, that motormen be required to be examined before a competent board and be licensed.

Fourth, that the working hours of motormen and conductors be reduced, and that they be allowed a reasonable time for their meals.

Fifth, that in view of the growing trolley mileage and its further extension, the Governor of the State be requested to specially convene the Legislature for the purpose of creating a commission whose duty shall be to supervise the construction and operation of trolley lines.

We think these recommendations are particularly timely, and should have the effect of compelling all companies to put the tracks over bridges in the best of order, so that they will be safe against any possible emergency that may arise in consequence of the neglect or carelessness of motormen.

A NATIONAL OPPORTUNITY.

The awful desolation which has fallen upon our newly-acquired possession of Porto Rico has aroused the compassion of the civilized world, and sympathy with the stricken inhabitants is already manifesting itself in the active measures of relief which are being taken in various parts of the globe. It is to the United States, however, as the parent country to whose guardianship they have only recently committed the interests of their island that these homeless and starving people turn in their hour of extremity, and we shall be false to our trust, to our traditions, and to our reputation as a generous, and warm-hearted race, if we fail to make an immediate and overwhelming response.

The active measures of relief which were started immediately upon the receipt of Secretary Root's letter to the mayors of the cities throughout the country show that the cry of the Porto Ricans will not be unanswered; but the danger of the situation lies in the fact that the country may fail to appreciate the absolute thoroughness with which the hurricane did its work, and the enormous amount of supplies which must be poured into a country from which both the people's homes, and the season's crops upon which they were to subsist, have been swept away. An American physician who was in Ponce during the storm states that the hurricane which devastated the island destroyed every stalk of sugar cane, every coffee tree, and every banana tree in its path, and sent the starving peasants trooping in from the interior to find an equal desolation on the seaboard. The official estimate by our military governor is that two thousand have been either killed outright or have died from injuries received during the hurricane. The number of homeless has been roughly estimated at over one hundred thousand.

The war to which we owe our present possession of Porto Rico was undertaken in the interests of humanity and not with the idea of conquest or possession. The statement to this effect was received with the ironical skepticism which was to be expected, and our present government of the islands which have passed into our care is being closely and curiously watched by those nations who believed that it was conquest and not humanity that prompted the declaration of war. In the relief of the Porto Ricans we have a splendid opportunity to prove that, unlike our predecessors in the tenure of the island, we hold it rather for what we can impart than what we can take away. It has ever been a part of "the white man's burden" in the work of civilization to carry the hunger and pestilence-stricken millions through their hours of sorrow, and we must see to it that these helpless people are both fed and clothed and housed, not merely for a day or a month, but until the exigencies of the situation permit them once more to become self-supporting.

But while the present sad plight of the Porto Ricans is largely due to unpreventable natural causes, its recurrence may be to a very great measure prevented by executing the proper engineering works for the control of the tropical floods. We are assured by a Porto Rican who was long resident in the island that it will be found that most of the destruction and fatalities were due to the floods and not to the violence of the hurricane. The island is traversed by a mountain range from which innumerable ravines, each with its own stream running through it, descend to the sea. During six to eight months of the year these streams are dry, but during such rainstorms as accompanied this hurricane, they become raging torrents. The topography of the country is such that it would be possible to impound these torrential waters, and utilize them for irrigation of the lowlands during the long dry season. By constructing a system of reservoirs, and by canalization of the larger streams, it would be possible, if not entirely to prevent, or least to control such devastating floods as have just occurred. The provision of such a system was frequently urged upon the Spanish government, and its execution, now that the island has passed into our hands, should receive the earnest consideration both of the government and the capitalists of this country. Such a system of works, following upon the efforts which are being made to meet the present emergency, would be a signal evidence of our desire to better the pitiful conditions under which this island has so long existed.

ACCURACY AND STYLE IN SCIENTIFIC WRITING.

In no profession, not even in belles-lettres, is the art of literary expression of such pre-eminent importance as in scientific writing. So much depends upon the accurate use of words and upon the manner in which they are grouped to convey the author's ideas, that it is surprising how little attention is paid by a large proportion of the writers of scientific articles to literary technique. Each mail brings to the editor's desk many contributions which, although they often contain subject-matter of considerable worth, are rejected because of their looseness of expression and general lack of literary merit. No doubt much of the difficulty experienced by the average student in mastering some apparently obscure scientific exposition is due to the author's inability to express himself with that clearness which is so essential to all forms of good writing. Popular science, in the opinion of many, is often a poor kind of science; but it owes no small share of its popularity to the perspicuity and simplicity which has characterized the style of its writers.

No man has greater need of a masterly command of the technique of his language than the scientist. He should devote much of his time to analysis in the verbal laboratory as well as in the chemical and physical, in order that he may habitually select his words and frame his sentences with a careful regard for their fitness to convey exactly and lucidly the thought in his mind. What is implied by literary technique is admirably told in the introduction to "Pierre et Jean," in which Guy de Maupassant narrates how under the rigorous training of Flaubert he was made to individualize an object so as to distinguish it from all others. One of the passages bears so directly on the topic under discussion, describes so admirably in its nervous French how Flaubert taught the youthful Guy to acquire skill in literary expression, that we cannot refrain from quoting it here:

> "When you pass," he (Flaubert) said to me, "a grocer seated in his doorway, a concierge smoking his pipe, a row of cabs, show me this grocer and this concierge, their attitude, their whole physical appearance; suggest by the skill of your imagery their whole moral nature, so that I shall not mistake them for any other grocer or any other concierge; make me see by a single word wherein a cab-horse differs from the fifty others that follow or precede him. . . . Whatever may be the thing which one wishes to say, there is but one word to express it; but one verb to animate it; but one adjective to qualify it It is necessary to seek this verb, this adjective, until they be found, and never to be satisfied with anything else."

A method so painstaking and refined would perhaps tend to destroy a writer's freshness and spontaneity; but for the scientist we cannot imagine a better course to be pursued.

The novelist or the essayist undoubtedly has an advantage over the scientific writer in so far as his subject is apt to be lighter, more easily followed, and, perhaps, more fascinating to the average reader. The mental effort of glancing through a novel or light magazine article is less than that of reading a treatise on stellar chemistry or biology; but it is within the power of a brilliant stylist, like Huxley, to render the effort pleasurable, even though the subject-matter be abstruse or in a popular way unattractive. The inaccurate use of a word in the one case has but little effect upon the context, and, indeed, may even be unperceived by the reader. In a scientific article, on the other hand, an expression carelessly used may render a whole passage obscure, or completely distort the meaning of a sentence. Hence, as some one has cleverly said, the aim of writing, and especially of scientific writing, is not that one may be understood, but that one may not be misunderstood.

Upon a vast number of readers, unfortunately, the refinements of literary art are lost. To many it is a matter of no moment whether an author vary the beginning of his sentences, whether his figures be apt and correctly employed, or whether he show discrimination in the use of words. But although the reader of a scientific article may not appreciate or make any note of the literary style of a writer, the result on his mind of clear exposition, terse description, and logical sequence of ideas is immediate and sensibly gratifying.

"COLUMBIA" AND "SHAMROCK" IN LIGHT WEATHER.

In our issue of August 12, we made a careful comparison of the speed of "Columbia" and "Shamrock," based upon their performance in wholesail breezes. At that time "Columbia" had not had an opportunity to test herself in light airs against "Defender" in a match race, nor were reliable particulars of the second "Shamrock"-"Britannia" race, which it will be remembered was sailed in a very light wind, at hand. During the past two weeks, however, the cruise of the New York Yacht Club has afforded several light weather tests, in which "Columbia" has shown remarkable speed, winning from "Defender" by even greater margins than her owners had looked for. At the same time the expert accounts of the race in light winds between the two English yachts show that "Shamrock" is also at her best in a four to six-knot wind.

The Yachting World, which thinks the "Shamrock" has an excellent prospect of winning the cup, says that the only real test in the second race was a beat in a steady wind from Cowes to the Norman Fort, a distance of nine miles, in which the challenger beat "Britannia" by twelve minutes. At this rate, she would beat "Britannia" by twenty minutes in the windward stretch of 15 miles on a 30-mile windward and leeward course. The same authority estimates that, in light winds, "Shamrock's" superiority to "Britannia," over the New York Yacht Club course would be from twenty-five to twenty-eight minutes.

Now, in 1895 "Defender," in light airs, beat "Vigilant" over a twenty-four mile triangular course by eighteen minutes, although it was estimated at the time that, allowing for shifts of the wind favoring "Defender," the advantage was about twelve minutes. This would amount to fifteen minutes in the thirty miles. "Columbia" has beaten "Defender" by nineteen minutes in twenty-three miles, the race being sailed at the average speed of about five knots an hour. This would amount to twenty-five minutes in thirty miles, and adding the fifteen minutes by which "Defender" has beaten "Vigilant," we find that "Columbia" is forty minutes faster than "Vigilant" or "Britannia" over a thirty-mile course in light winds. This agrees with the results in the recent cruise, where "Columbia" showed an advantage of nearly an hour over "Vigilant," the latter sailing in her cruising trim. In light airs, then, "Columbia" would appear to be from twelve to fifteen miuutes faster than "Shamrock" in thirty miles.

These results are not inconsistent with those arrived at in our comparison of the boats in wholesail breezes, in which "Shamrock" appeared to have a slight advantage on a windward and leeward course. For a boat that is canvased for light airs may be relatively indifferent in a strong wind. "Valkyrie III." won from "Britannia" in a light wind by over eighteen minutes; but