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SCIENCE AND SENSATIONALISM.

One of the most astonishing features in the development of modern journalism is the magnitude and successful audacity of the Sunday issues of the great daily papers, and among these there are none quite so successful in self-advertisement, with the unthinking half of the public at least, as those issues which are marked by the distinctive characteristics of yellow journalism.

Now, the yellow journal is nothing if it is not sensational, and in its quest for startling novelties to whet the palate of its readers, it invades every possible sphere of human life and interest and every branch of human knowledge. Science, which, one would have thought, would be severely let alone, is a favorite hunting ground of the reporter, and whole pages of the yellow journal seventh-day editions are loaded down with pseudo-scientific pabulum, upon which the Sunday reader is supposed to satisfy his hunger for scientific knowledge. The reporters for these journals are apparently sent out into the domains of science charged with a commission to magnify mole hills into mountains and use such facts as they may pick up as texts for exuberant essays, in which rhetoric gorges itself with superlatives and becomes positively tipsy with the fumes of its own wild imaginings.

Hence it is by the merest promptings of self-respect that the average man of science shuns the noisy notoriety of a Sunday paper "write-up," and reserves his announcements for the columns of the technical and scientific journals, or a lecture desk in the auditorium of the learned associations. The practice, the etiquette, we had almost said the ethics, of scientific research agree in rebuking the former and approving the latter method of making public announcement of results actually accomplished.

We shall not soon forget the extreme mortification exhibited in our presence on a recent occasion by a medical expert when he discovered, through our application to him for the true facts of the case, that the details of a difficult operation just performed by him had been published, with flattering encomiums and the inevitable inaccuracies, in a certain daily paper, thereby anticipating a paper on the subject that was to be duly presented in the columns of the medical journals.

This is the true professional spirit, and every departure from it tends in some degree to subvert the interest of science, and throw a stumbling block in the way of the honest seeker after knowledge.

We note with considerable regret that subsequently to his first extraordinary interviews, Mr. Tesla has seen fit to place himself at the service of those New York Sunday papers that are more or less notoriously sensational, with the result that the "annihilator" has taken on fresh terrors. It is now illumined by the flaming brush of the artist, and the public is diverted with realistic scenes in which the nine days' wonder is depicted as speeding, now above, now beneath the surface of a sea which is always propitiously calm, under a sky and in an atmosphere that are ever opportunely bright and clear, against a ship that is ever fortuitously within easy range, and always with the inevitable and unutterable result!

Judging from the comments of the scientific and technical press, we are not alone in our expressions of regret that any one of Mr. Tesla's undoubted ability should indulge in such obvious and questionable self-advertisement. That the author of the multiphase system of transmission should, at this late day, be flooding the press with rhetorical bombast that recalls the wildest days of the Keely motor mania is inconsistent and inexplicable to the last degree.

The facts of Mr. Tesla's invention are as few and simple as the fancies which have been woven around it are many and extravagant. The principles of the invention are not new, nor was Tesla even their original discoverer. While the present application of these principles is novel, there is nothing whatever in the device to warrant the sweeping claims which have been made in regard to its destructive powers. The connecting cable in the dirigible torpedo is only one of many insuperable obstacles to its success. Mr. Tesla has removed (or rather believes that he has) this one defect; let him now apply himself to mastering the others. Before he announces his ability to blot the navies of the world out of existence, let him answer a few pertinent questions, as follows:

If the torpedo must be seen to be controlled, and is scarcely visible at a distance of over a mile, even in a calm sea, how, in view of the great range, rapidity and accuracy of modern rifles, is the operator to keep within striking distance of the enemy? If the course of the torpedo can with difficulty be followed in calm weather, how will it be traced when the surface is disturbed even by a moderate sea, to say nothing of more boisterous water? Furthermore, what becomes of its accuracy in thick or foggy weather? The apparatus employed by Tesla is extremely sensitive to shock; how then will it fare amid the terrific concussion of a modern sea fight? If one of these weapons should be lost sight of in its course, does it not at once threaten friend and foe alike, and is not the operator himself in danger of being incontinently "hoist with his own petard"?

Lastly, and most pertinent question of all: What is to prevent the enemy from installing a transmitter on his own ship and himself sending out waves to act upon the receiver in the torpedo? We fail to find any provision made for this contingency, either in the patent or in any of the published interviews of the inventor. With a transmitter in the hands of the enemy the proper sequence of the motions of the torpedo could be destroyed, and the control of it prevented.

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THE REMOVAL OF A GREAT ENGINEERING LANDMARK.

Engineers the world over will naturally feel some sentimental regret as they witness the removal of the great tubular bridge across the St. Lawrence at Montreal, which, for half a century, has formed one of the most notable landmarks in the development of the art of bridge construction. At the date of its erection it was unquestionably the largest bridge in existence. No structure of the size, or involving so many or so great untried problems of construction, had ever been attempted in the history of engineering, and an undertaking like this, which would be of the first importance even at this late day, becomes positively daring and colossal when we bear in mind that it was inaugurated when the science and art of modern bridge building were in their very infancy.

Apart from the magnitude of the work in respect of its great length (6,592 feet) and the immense amount of material (10,000 tons of iron and 100,000 cubic yards of masonry) employed, special credit is due to those engineers of half a century ago because of the exceptional difficulties of the site on which the bridge was built. Twenty-four masonry piers had to be built in one of the swiftest of the large rivers of the world, where they were exposed to the double danger of scour from below and accumulated ice pressure from the ice above. That these dangers are real and ever present was shown by the recent collapse of a pier in the Cornwall Bridge, which is now in course of erection across the same river. The building of the piers involved some very difficult cofferdam work, and as there had been but little previous work of the kind attempted by engineers, at least under such trying circumstances, the engineers, Mr. Ross, of the Grand Trunk Railway, and Robert Stephenson, of Menai Bridge fame, had to proceed largely on their own initiative. How well the work was done, both in superstructure and piers, is proved by the fact that, after a lapse of half a century, the iron tubes were carrying safely the heavy trains of the present day, and that the old piers have been found fully equal to the task of carrying a modern superstructure double the size of the one which has been replaced.

The illustrations on another page showing the old within the new structure form an admirable object-lesson in the progress of bridge construction during the past fifty years. The square tubes of solid plate iron represented the accepted theories of construction in the forties and fifties, just as the open, skeleton-like pin-connected trusses of the new bridge embody the latest ideas of long-span structures at the close of the century. The change from the one style to the other has been very gradual. It has been brought about partly as the result of a clearer apprehension of the principles which govern the strains in engineering structures, and it is partly due to the improvement which has taken place in the materials of construction.

In early days the strength of materials had not been determined with the accuracy which marks the modern testing laboratory, nor did they possess that uniform quality which we now look for in the product of our rolling mills. There was a certain measure of distrust inseparable from work which, for want of precedent, was frequently of an experimental character.

The simple wooden beam thrown across a creek is the simplest form of the bridge, and the earliest attempts at building iron bridges, of the beam as distinguished from the arch construction, show a reluctance to depart from the solidity of the prototype. The tubes of the Menai and Montreal bridges were simply hollow beams, and as such contained an excess of material above that which would be necessary to provide the same degree of strength in a bridge of modern construction.

As the advantage of depth in providing maximum stiffness and strength with a minimum of material came to be recognized, we find the ratio of depth to length, which in the tubular bridge was one to fourteen, gradually increasing until one to eight and one to six are to-day common ratios. Thus, comparing the old and the new Montreal bridges, we have for the tubular structure a depth of 18 feet for a length of 247 feet, as against a depth of 40 feet for a length of 254 feet. The shallow depth produced very high strains in top and bottom members of the tubes, and in the Menai Bridge these are massive cellular structures of great weight. The web systems, which in the tubes are solid plating, have given way first to the "lattice" web, composed of multitudinous intersecting bars, then to the "double intersection" web, in which rectangular posts for compression and flat eye bars for tension made their appearance, and these have been replaced in turn by the modern "single intersection" system, in which the last ambiguity as to the strains is removed and the construction is greatly simplified. In place of the single solid plate top and bottom chords, we have each web system associated with its own separate chords—a latticed rectangular construction being used for the top chord, which is, of course, in compression, and flat eye bars for the bottom chord. The moving loads are carried by a system of longitudinal stringers and transverse floor beams, the latter being carried at the panel points.

The modern pin-connected truss bridge is, perhaps, the most perfectly scientific structure in the engineering world. The static stresses to which it is subjected under given conditions of loading are known to within a few score pounds, and not a pound of material is put into it that can be called superfluous.

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FLAX CULTURE IN THE UNITED STATES.

The historical records of the United States, says The Journal of the Society of Arts in a recent issue, show that flax culture was one of the earliest of colonial industries, and until comparatively recent years the culture and manufacture of flax in America have been household industries. American colonists brought with them the art of raising flax and of preparing and spinning it by hand, and even fifty years ago the custom prevailed among farmers of growing flax and having it retted, scutched, hackled, and spun by members of their household. In the history of Lynn, Massachusetts, it is stated that about the year 1630, "they raised considerable quantities of flax, which was retted in one of the ponds, thence called Flax Pond." As early as 1662 the State of Virginia enacted that each poll district should raise annually and manufacture six pounds of linen thread. All the records of New England also give evidence of an earnest desire to promote the cultivation of flax and its manufacture.

In a report to the United States Department of Agriculture by the special agent in charge of the office of fiber investigations, it is stated that about 1778 a number of colonists arrived from Londonderry, bringing with them manufactured fabrics of linen, and the implements used in their manufacture in Ireland. The matter was earnestly taken up by the Bostonians, and a vote passed to establish a spinning school. About 1721, at Newport, Rhode Island, "hemp or flax used to be received in payment of interest, the former at 8d., and the latter at 10d. per pound." Pennsylvania offered premiums for several grades of linen thread in 1753, and the Society for the Promotion of Arts, Agriculture, and Economy, of New York, after adopting resolutions to arrest the importation of British goods, offered premiums for linen thread. The early records of Rhode Island develop further interesting facts concerning an association of plantation maidens about 1766. The order was known as the Daughters of Liberty. It is not necessary, however, to go back a hundred years, or even fifty years, to learn the story of American household linen manufacture, for a remnant of the industry still exists in the mountains of Virginia, North Carolina, and Tennessee, and an interesting series of the fabrics made in these localities in recent times has been secured for the United States National Museum.

Sixty years ago, about 750,000 pounds of flax fiber were produced in the United States, and flax was sent to market from Connecticut that was as strong and as good as any raised in the United States at the present time. Very strong and flexible flax also came from northern New York and Vermont, but it was not clean. The poorest flax of those days came from New Jersey, although it is said that that State has been capable of growing flax equal to that of Archangel. At the present time flax is largely grown in the United States for seed, the straw, of inferior quality, when used at all, going to the tow mills or the paper mills, and being worth from 4s. 2d. to 33s. 4d. a ton. In the older States the area under present cultivation is very small and is steadily decreasing. In the newer States, or States where agriculture is being pushed steadily westward from year to year, the area under cultivation about holds its own, taking one season with another. Cultivation for fiber is beginning to attract attention, however, and the