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WORKING MEN'S VISITS TO THE CENTENNIAL.

According to present indications, the cost of living in Philadelphia during the Centennial is going to be high. It is but natural that the citizens will avail themselves of the golden opportunity offered by the immense influx of transient visitors, and hold temporary accomodations at prices which will severely tax the average purse. While this state of affairs may not work as a hindrance to the visits of those living within a moderate distance of Philadelphia, and who will therefore avoid heavy traveling expenses, it doubtless will be the means of keeping away a large number of others residing in more distant parts of the country, and especially working men, who will probably be the most appreciative visitors but whose funds to spare for the occasion will be closely limited. It seems to us that, of all classes which, it is expected, will be benefited by the Exposition, the working men stand first. We do not believe that any intelligent workman can examine the display without being improved thereby, and that even the dullest individual will leave the grounds with his ideas widened and with some useful knowledge of the skill and progress of others, in at least his own trade.

The tendency of the present time is to dignify labor, to convince men that to work is not degrading, and that the educated worker with hands is the peer of the educated worker with brains. Mr. Gladstone in a recent admirable address on Science and Art, says to working men: "Blend the beautiful with the useful, and the distinction between what is manual and what is mental will be lost, to the manifest gain of your class, to the unspeakable benefit of all." "Ennoble your work, and it will ennoble you" is the translation of the above into shorter terms: but to ennoble or improve work without education is impossible; and in that subtle and most effective form of education which instructs by arousing the desire to strive and do likewise, the education afforded by the museum of art, and the exposition of other men's consummate skill, this country has been sadly lacking. With the Centennial, however, begins our greatest attempt to supply this need, and by the Centennial is offered to working men of every class such an opportunity to study and to emulate as no other exposition heretofore held has ever paralleled, even in point of magnitude. We need not argue further to show that what elevates and raises the working men likewise affects the whole community, and that, by benefiting the one, we indirectly, though none the less surely, benefit the other.

To come back to the practical side of the subject, it must be admitted that, if excessive prices at Philadelphia are going to act as a prohibition to working men visiting the exposition, and thus act as a bar to their acquiring the benefits referred to, then it is not only in the interest of the men themselves, but of those who directly gain by the work, to devise means of avoiding unnecessary expenses. And here we think is an opportunity for the unions and trade societies to come forward and benefit their members. Some of the unions have large and influential memberships and possess considerable funds. A small tax would greatly augment the latter, and perhaps in this way a sum could be raised to put up and maintain buildings especially devoted to working men's accommodation. These edifices need be but temporary structures on rented ground, and the charges for occupying them should be but slightly above actual cost of maintenance. If the large unions would each erect their own structures, and the small ones club together and build, all the trades would be represented, and working men of all classes would be provided for. For non-union men a slight extra charge, equal to the tax imposed on the society men, might be made, and thus in the end the unions, besides benefiting all workmen, would profit pecuniarily by the operation.

It would be a wise plan for large employers and societies to confer with railroads and other transportation companies, and arrange special rates for transporting working men at prices below the reduced excursion tariff offered to the general public, and to issue special working men's tickets, to be bought through employers and societies. In the same way the unions or any association of individuals may erect workmen's accommodations and issue tickets for a certain number of days' board and lodging.

As regards the action of employers themselves, we presume that nearly all will see the benefit of affording their men as much opportunity as possible to visit the Centennial. Where it is out of the question to afford holidays sufficient for all to go, the privilege might be granted to the most deserving, or held out as a reward for special effort. It might be well for those who approve such a course to notify their men now that the two workmen in each department of the works, for example, who should show the best record for attention to duty, etc., between the present time and, say, July 1, would then be furnished with tickets to and from Philadelphia, and lodging tickets while there, and given as many holidays as the employer might fix upon. A report from these men might be requested on their return, or they might be given to understand that each would be desired to explain before his comrades whatever he had seen of interest in their especial branch of trade. Another suggestion we have to make is that an employer should, when he is likewise an exhibitor, and displays some object which, like an engine or steam pump, requires attention and care, instead of keeping one man at that duty, if it be anywise possible, send a different one from the works every week, or every three days. In this way a large number of working men may see the Exposition without the employer's incurring any considerable expense.

THEORY AND PRACTICE.

We published an article on page 8 of our current volume, in which we showed how the results obtained in practice, in regard to the effects of expansion of iron in bridges, did not agree with those of the theoretical calculations; and this is only one instance in which theory and practice appear to disagree. Some persons go so far as to assert that they never agree, while others even say that they cannot agree. We, however, maintain that they must invariably accord, and that, if this is not apparent, the practice is defective or the theory incomplete. This opinion is founded on an experience of many years, by carefully investigating all cases where such disagreement appeared to exist; and our faith in theory has proved to be well founded in every case in which the theory was complete, and the practice, if not perfect, at least of such a nature that the imperfections could be ascertained.

A case wherein an incomplete theory was taken as the basis of a calculation is found in the article already mentioned, in regard to the effects of expansion of the iron in bridges. The data, on which the theoretical calculations was founded, were obtained from experiments concerning the expansion of metals by heat while the specimens were not under compression, and their contraction by cold when not under strain by extension. In order to use such data as the base for calculating the effects of expansion and contraction in iron structures, it will be necessary that the experiments be repeated, and new coefficients of expansion and contraction be obtained by experiments in heating and cooling metals while under great strain; in this way we may ultimately ascertain the law which modifies the figures now in use, which must be varied according to the compression or extension which is brought to bear on the expanding or contracting metals. Notwithstanding that this expansion and contraction are exceedingly powerful and able to overcome very great resistances, it cannot be maintained that such resistances are without any influence on the amount of expansion and contraction, and it is for the determination of these amounts, for different degrees of resistance, that new experiments are required. This is only a single instance of the great work which yet has to be done by engineers in settling the data for calculations as to the strength of materials, calculations on which depend the success, scientific as well as economical, of the labors of the many great men in the profession of civil engineering.

DRAWBRIDGE INCONSISTENCY.

It has always seemed to us that no one could stand by the great bridges which span the Hudson river at Albany, and witness the immense fabrics slowly swing their huge draws open to admit the passage of some puffing little tug not a hundredth part of the size of the whole structure, without being struck with the incongruity, if not absurdity, of the proceeding. A passenger train may be delayed on each bank of the river, and crossers innumerable may wait as patiently as they may on each approach of the bridge: all this is of less consequence than the passage of a tow of slow canal boats, or of some solitary sloop or schooner. The Albany bridges are, however, but a sample of drawbridges in general, and the question why draws should exist in a great number of instances, or why should vessels have the right of way, applies to the entire class. Once upon a time, when railroads were not, and the principal traffic of mankind was done by water, it was important that the path of vessels carrying on commerce should not be barred. Public policy gave them a right of way over the stage coach, and bid the latter wait until the more important conveyance had passed. The law recognized this, and courts in their decisions wisely sustained the law in its strict interpretation. But as the times changed the law did not, and justice, proverbially blindfold, was especially so in this regard, and entirely failed to perceive that the railroad had supplanted not merely the stage coach, but the freight vessels as well, and that rapid transportation was and has been for some time past the last thing expected by those who ship their goods *via* river schooner or canal. Consequently justice or law has stupidly persisted in making the railroad train at forty miles an hour give way to the sailing craft at four knots, that is to say, cars loaded with perishable freight perhaps, or impatient passengers to whom time is money, or the fast mails of the public, must stand a longer or shorter time on the brink of a river and wait the passage of a schooner load of brick or lumber. Why? If there be any sound reason for the preference, we confess our inability to perceive it.

Nor is this all. Although it presumably may be supposed that, for the protection of their own property, railroad companies will avail themselves of the most approved means of avoiding disaster and accidents, the fact nevertheless remains that, despite such means especially adapted to warning trains approaching drawbridges, trains have run headlong into the open gulf again and again. On most roads engineers are cautioned to bring their locomotives to a full stop at a certain point just before reaching the bridge; but here is delay again, coupled with the probability of the rule, like every other based on human fidelity or prudence, being slighted or neglected.

If a bridge barred a great harbor, like that of New York for example, or even a less port, where the commerce by water was of major importance, it would be wise to give vessels the right of way; but such a condition of affairs practically negatives the existence of a bridge as a means of crossing, since the repeated interruptions to travel would speedily cause a resort to tunneling or other means, as a cheaper and far more convenient alternative. It is, therefore, very rarely that we find the railroads blocked by drawbridges for really important causes. In the case of Albany, no ocean vessels ascend so far up the river, and nothing larger than the regular river steamers for Troy have occasion to go under the bridges. On scores of railroads, there are draws which serve no more useful purpose than the admission of a chance schooner into some short arm or inlet. It would be a much better policy to abolish drawbridges altogether wherever the condition of affairs is such that a steamer by knocking down her funnel, or sailing vessels by lowering their upper masts, can pass under: or else to alter the laws to conform to those now in existence in Holland, which forbid any vessel approaching a drawbridge when a train is due. It is a very easy matter to house topgallant masts in large ships, or to lower topmasts in a fore-and-after; as for dropping funnels, it is done, by every penny steamer that plies along the Thames at London, dozens of times daily. Bridges without draws