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THE PANIC AND THE LABORING CLASSES.

The daily journals of the past week have exhibited such crowded columns of reports from all parts of the country, indicating the temporarily depressed condition of the manufacturing and industrial interests, that it is hardly necessary here to particularize individual cases as evidence of the prevailing despondent feeling. By far the majority of establishments are retrenching: some by reduction of working force, others by cutting down hours, and more by removing a percentage from the salaries of employees. While the outlook is far from cheerful, there is a belief that the worst is over. The railroads and many of the iron foundries still take a gloomy view of affairs, and we notice that reductions of expense are yet being largely made.

With all the facts in view, however, we still are inclined to adhere to our belief in the passing nature of the trouble. We find much to applaud in the course adopted by many establishments, which, trusting to the early revival of better times, are working straight on, with no greater alteration in their business routine than such as they are imperatively driven to make. So far as the producers of the necessities of existence are concerned, we think little apprehension need be felt as to their rising superior to the disaster; but with reference to those who gain their living from the manufacture or sale of articles pertaining to the luxuries of life, there is a probability of less favorable results.

To the workmen, however, the prospect is indeed dark. No pay on Saturday night means, to hundreds, no dinner on Sunday—no rent for the coming week—no fuel to keep off the bitter cold of winter. In ordinary times, these men might seek other employment, or turn to some labor, the return for which would keep body and soul together; but now, when thirty thousand operatives in this city alone have been thrust from employment, the chances of gaining comfortable support for a family are far from promising. Let employers put themselves in the places of their hands, and imagine their own feelings in so dire a strait, and then think of the hardships which, perhaps through a mere sentiment of over cautiousness, they entail, not only upon their immediate workmen, but upon their families and the host of other people dependent upon their small custom for a means of existence. It is for this reason, above all others, that we advocate the keeping open of every industrial establishment while its bare expenses can be met, no matter if not a cent of profit be made, or even if some loss accrue. Better far that the rich should sacrifice a portion of their wealth than that the poor should be left destitute or driven to pauperism.

Another lesson, and a fruitful one, is to be gleaned from the pending crisis, which the workmen would do well to take to heart. It is the utter futility and hollowness of strikes, and notably that of a year ago, when regarded in connection with the present aspect of affairs. It is strange that hardly twelve months should elapse before the very condition to which a number of wrongheaded men strove to reduce the employers, through coercion and an unjust exercise of power over the ignorant, should be brought home to their own doors. The defeat of the great movement of 1872 was complete enough, but it has been reserved for the panic of 1873 to give it double effect and to render its teachings indelibly impressed.

As to the means of alleviating the condition of those who, it now appears, are to be so sadly reduced during the coming winter, some organized plan will undoubtedly become necessary. A contemporary suggests the division of large cities into districts, and the appointment of suitable committees to visit the houses in each, in order to solicit contributions to a general fund. Our opinion is that now is the time for the trades' unions to assert themselves, and to prove that they are unworthy of the odium under which they now labor. Several of these organizations, during the great strike,

boasted freely of their reserve capital and of the assistance to be gained from kindred societies in Europe. Now let the International and the British associations, which send such earnest emissaries here, come forward and render that aid which they have so freely promised. If the trade associations will join forces, and labor, not merely in the interest of their own members but of all working men, they will do more towards elevating the condition of the laboring classes than they could accomplish by any number of successful strikes.

THE PROGRESS OF THE HELL GATE EXCAVATIONS.

General Newton, of the United States engineers, the officer in charge of the government works at Hell Gate, has recently submitted his annual report of progress made in that important undertaking. The various tunnels and galleries now aggregate in length 5,884 feet, of which 2,731 feet constitutes the advance of the past year. The total amount of stone removed during this period is 9,554 cubic yards, of which 7,619 yards were extracted by the Burleigh drill, 185 by the Diamond, and the balance by hand work. About ten linear feet of holes have been made in each cubic yard of rock; and to explode this large number of blasts, 11,808 pounds of nitro-glycerin, 1,218 pounds of giant powder, and 3,445 pounds of black powder have been employed. In hammer work, 9-03 feet of hole and 0-9 pounds of nitro-glycerin correspond to one cubic yard of rock blasted.

The report speaks very favorably of the operation of the Burleigh drill, each machine, it is stated, having made for the year an average of 25 feet per shift of eight hours. The loss of steel by abrasion and drilling is estimated at 0-54 ounces per linear foot, a calculation which of course must be confined to rock of similar nature to that at Hallett's Point. The balance of the report refers more particularly to the operations of the steam drilling scow during the year 1872, reference to which has already been made in these columns. There is the usual complaint of delay and increased cost of operations, owing to the lack of necessary funds. It is strange that Congress is so apathetic in this regard. The importance of securing a free channel from Long Island Sound to the East River has been so frequently and so forcibly urged, and so much money has already been expended in fruitlessly endeavoring to secure the same, that there can be no reason for withholding the means of completing a work regarding the ultimate success of which no doubt can be entertained. Delay, as General Newton has so often pointed out, only increases expenses, and besides indefinitely defers the advantages to be gained by both city and country. We were told during last winter that at that period a sum in the neighborhood of five or six hundred thousand dollars would be sufficient for all purposes. It seems to us that both our city and state authorities should, during the coming session of Congress, especially interest themselves in this matter, and, by the exercise of their powerful influence, ensure the appropriation of the balance now needed to effect the speedy completion of operations.

A RECENT IMPROVEMENT IN GAS MAKING.

On another page of this issue will be found an illustrated description of an improved plan of gas manufacture, which has recently been put in practice at the works of the Citizens' Gas Company in Brooklyn, N. Y. It is a matter of general information that the forcing of jets of superheated steam through anthracite coal, over heated metal, or through a furnace fire, is not a new idea, nor is it our intention in the present instance so to infer. Some sixty patents or more have been granted for "water gas" and kindred processes, dating as far back as 1823. The system in general has found many opponents, notably, among others, the late Dr. Torrey; while Professor Wurtz, in published reports on the subject, has pointed out that it is impossible to convert the steam entirely into hydrogen and carbonic oxide. Some of the steam, he considers, is not decomposed, and, passing into the coal retorts, operates injuriously, probably by oxidizing the olefiant gas. In conclusion, the same author remarks that the greatest of practical objections is "the uncertainty of the quality of the product."

Without entering further into the details of the subject or inviting discussion of the vexed question in the present connection, we submit simply a statement of facts as laid before us through the courtesy of the President of the above named company, W. P. Libby, Esq. Whether gas experts may or may not hold that the operation and apparatus we have described are economical, remunerative, or of any advantage whatever, is not the point upon which we wish to dwell. The books of the company, we are told, indicate no inconsiderable saving, while the aspect of the works, the absence of the usual complement of hands, the diminished requirement of coal, and finally the satisfaction expressed by the officials employing this threefold process, add still further testimony in corroboration of its apparent value and utility.

POSTAL SCIENCE.

It seems to us that the postal regulations now in force are singularly inconvenient, not to say unjust, as regards publishers, who, in the ordinary course of their business, find it necessary to transmit large quantities of printed matter through the mails. We have already called attention to the fact that we are now preparing a special edition of sixty thousand copies of the SCIENTIFIC AMERICAN, numbers of which will be mailed to persons in every city, town and village in the United States. As the recipients of these papers will in all cases be non-subscribers, the postage thereon must be paid in stamps previous to mailing; so that, at the rate of two cents per copy, the aggregate expenditure for this item alone will reach the sum of twelve hundred dollars.

Now sixty thousand papers would supply 1,154 subscribers with one copy each per week for one year. But each person, paying at his own post office, would be charged only five cents per quarter postage, or twenty cents for the entire period. Consequently, the 1,154 people would together aggregate the sum of about \$231, or a very little over one sixth of the amount which we pay in advance in order to send all the numbers at once. If, as it is urged, the low rate of postage to subscribers has for its only end the facilitating of the dissemination of news and useful knowledge, then why is it not equally fair to further the same object by giving those who produce the means of imparting such information similar advantages? Why should we, in the present instance, be required to hand out one dollar and four cents for sending fifty-two copies of our special edition at once, when if we forward the same number of issues of our regular publication, weekly for a year, our subscriber would be taxed only twenty cents?

Again, is it not possible to simplify the mode of sending such masses of matter, to the interest of both government and publishers? We are now obliged to purchase sixty thousand stamps—three hundred sheets—and go to the labor of pasting them on the wrappers, after which each stamp of course has to be cancelled in its passage through the mails. It seems that it would be a much easier proceeding for the Post Office to detail one employee to weigh the entire issue, note the result, and thence calculate the charge at regular rates. This sum determined, we could pay it at once, the papers would be despatched, and the proof of prepayment might simply be a hand print of "New York—paid," or something of similar kind, applied by the same people and in the same manner as they would obliterate the ordinary postage stamp. The government would thus gain the cost of manufacturing the sixty thousand two cent stamps, while we should be spared the trouble of affixing them.

In England, the sender is not obliged to stamp his matter if the postage thereon equals or exceeds one pound sterling. If, for example, he has two hundred and forty letters to forward, at the rate of a penny each, the office weighs them and receives the cash, stamping them paid in the manner above noted. Or, in other cases, if it be so desired, the post office will emboss stamps upon wrappers or envelopes of any size, upon any variety of white paper, without any charge other than the face value of the imprint. These plans might well be put in practice here, and it seems might prove of no small convenience. For the English newspapers even a better arrangement is in existence. Formerly there was a revenue tax on every journal, which covered its transmission, free through the mail, for any number of times up to a certain date from that of its publication. London papers were sent from the publishing offices to those of the Internal Revenue, at Somerset House, where the proper stamps were affixed; after which no further payments were required. Now, however, the income goes directly to the post office; but instead of obliging journals, like the London Times, for instance, the circulation of which outside of the capital is very large, to buy and attach innumerable penny stamps, an electrotype of the government imprint is locked up and struck off in the regular forms of the paper. An official is stationed in the press room to count the sheets printed, and the proprietors pay the tax called for by his report.

The efforts toward postal reform, which have been for so long advocated by both press and people, were well inaugurated by our last Congress in the abolition of the franking abuse, the establishment of charges upon exchange newspapers, and the authorization of the postal cards. It remains for the coming legislature to continue the work by reducing the postage on all letters, sent within the United States, to the uniform rate of one cent; while, at the same time, we trust that the discrepancies which we have pointed out in relation to newspaper charges may be fairly adjusted. The question of increasing the facilities for transmission, by means similar to those referred to above, is within the authority of the Post Office Department, and merits its careful consideration.

ON THE MOLECULAR CHANGES PRODUCED BY VARIATIONS OF TEMPERATURE.

Professor R. H. Thurston, of the Stevens Institute, has prepared a very interesting paper on this subject, in which is presented, in brief form, a history of the various practical experiments and the conclusions reached by different observers on the above subject. He states that the most complete investigation ever made, particularly to determine the effect of changes of temperature in modifying the physical properties of iron and steel, was that of Knut Styffe, the director of the Royal Technological Institute at Stockholm, Sweden, and supplemented by the experiments of Christer P. Sandberg, who translated the report of Styffe into English.

The work of the first named engineer was done at the instance of a committee appointed by the King of Sweden. It was commenced by Professor Angstrom, continued by Herr R. Thalen, of the University of Upsala, and by Engineer K. Cronstrand, and it was finally concluded, with the assistance of Cronstrand and Lindell, by Styffe, who wrote out the results of the whole investigation and made the report public.

These labors were begun in 1863, and extended over several years.

The conclusions of Styffe were:

"(1). That the absolute strength of iron and steel is not diminished by cold, but that, even at the lowest temperature which ever occurs in Sweden, it is at least as great as at ordinary temperature (about 60° Fah.)."

"(2). That, at temperatures between 212° and 392° Fah., the absolute strength of steel is nearly the same as at ordinary temperature; but in soft iron, is always greater."