THE COAL HOISTING AND DISTRIBUTING PLANT OF THE MANHATTAN ELEVATED RAILROAD, OF NEW YORK CITY.

We illustrate in the present issue one of the plants for coal hoisting, weighing, and distributing of the Manhattan Elevated Railroad Company, of this city. It is the one supplying the Second and Third Avenue lines with fuel. The entire structure, which is built almost entirely of steel, so as to be practically fireproof, embodies the latest improvements in coal hoisting and distributing machinery. Day and night, throughout the entire year, a constant succession of locomotives back under the delivery shutes, and receive therefrom weighed portions of coal. When it is realized that the hoisting capacity of the plant is 600 tons per day of ten hours, and that in the same space of time many hundred engines can be supplied, and a quantity of coal can be stored in the yard for future use, some idea of the extent of the plant can be formed.

It is situated on the banks of the Harlem River, nearly at the end of Second Avenue. Some sixty feet above water a deck or platform is established, carried on lattice columns. This deck runs parallel with and almost directly above the edge of the dock. It is traversed longitudinally by a hoisting apparatus of the well-known type embodying the improvements of Mr. C. W. Hunt. This apparatus is shown on the upper portion of the cut. It is mounted on wheels and traverses a line of rails. On the platform of the hoisting machine is established a steam hoisting engine, with 10 × 12 cylinders, operating a 29 inch drum by 3 to 1 gearing. This engine is on the rear of the platform. From the front projects an iron boom or jib inclined downward. Near its end is seen the hoisting pulley, from which depends the bucket in which the coal is hoisted. Assuming the bucket to be in the hold of a barge and to be filled with coal, the hoisting operation is as follows: On starting the engine the bucket is drawn vertically upward until the boom is reached, when of course it can go no further in a vertical direction, but on working the engine, the bucket is drawn up along the line of the jib, as if on an inclined plane, until it is brought directly over the coal hopper. Here the latches are tripped and the bucket delivers its contents, and when empty is returned by the same path, only in a reverse direction, to the hold of the boat. The engineer stands in the little house seen on the right of the hoisting stage overlooking the water, from whose windows he has a full view of all operations.

It is evident that the place where the bucket will descend is determined by the point of the boom where the hoisting pulley begins and ends its movement along the same. This point is determined by a chock, which, by worm and chain gear, can be moved up and down so as to bring the line of descent of the bucket nearer to or farther from the dock. This gearing is operated by a rope extending from the end of the boom to the deck of the boat. The bucket employed is a self-filling bucket, also the invention of Mr. C. W. Hunt, and termed the Hunt shovel. When its latches trip and it discharges its coal into the hopper, the bucket opens at the bottom like a pair of jaws. In this position it makes its descent into the hold of the boat and rests open mouthed upon the coal. On applying the power, the bucket is forced to close. As it does so, it works its way through the coal, and when the jaws come together is completely filled. In one of the cuts, Fig. 3, we show the bucket as it appears when burying itself in the coal. It is then hoisted as described. A chain cable is employed with sprocket wheels for the hoisting operations. The bucket lifts a ton at each operation, and the entire round trip can be completed in forty-five seconds. The capacity is put at sixty tons per hour.

As coal has to be hoisted from different holds of the same barge, and as the limits of the dock admit of comparatively slight movement of the barge, the hoisting apparatus is moved on its tracks, backward or forward, so as to work the barge in any way desired. When in position, it is clamped to the rail, so as to be incapable of further movement. It is drawn back and forth by rope tackle operated by steam capstans. This shifting of the hoisting apparatus interferes with any fixed steam supply, as steam is received from one of the vertical pipes seen on the left of the cut. For each of these pipes, therefore, there is supplied a screw and lug coupling, Fig. 4, of rapid adjustment, and for each position of the hoisting apparatus there are two such pipes, one for steam supply, the other for the exhaust; the pipes are uncoupled and the next ones coupled at each movement. The apparatus can thus be shifted 12 feet at a time, and any minor adjustment is determined by shifting the boat. In one of the cuts we show the joint used for coupling the steam and exhaust pipes.

The hopper, whose edge can be seen projecting from behind the engineer's house, Fig. 1, holds several tons of coal, and is fitted with two delivery shutes. Two lines of tracks lead under these shutes, and hand cars run on these tracks.

When a car is filled it is run back and away from the dock to a coal pocket, where it is dumped after weighing. The top of this coal pocket is on a level with the floor shown in Fig. 1. Under the pocket and leading from it are five iron shutes, Fig. 2, beneath each of which shutes one of the elevated railroad tracks leads. The engine requiring coal is backed down on one of these tracks, bringing its coal box under one of the shutes. The shute is provided with a gate worked by the counterpoised lever seen in the cut, by which coal is delivered or cut off. Between the shute and the engine is a weighing hopper, virtually a prolongation of the shute proper. This is hung on a Fairbanks steelyard, on which are secured two poises, one representing the tare of the hopper, the other set at 560 pounds or one-quarter of a long ton.

The duty of the weighmaster includes the charging of these weighing hoppers. This he does by delivering coal to them until the beam nearly overbalances. The arrangements of the coal shutes and their gates are such that this operation can be conducted with great nicety. As an engine passes under the shute, the weighmaster notes its number, and it takes as many hoppers of coal as it requires, each representing exactly one-quarter of a ton. The weighmaster enters on his record, opposite the number of the engine, the quantity of coal which it took, and each day forwards his report to the office. At the same time the engine takes in a supply of water if required.

This series of operations goes on night and day, week days and Sundays, without cessation. Every week the account of coal consumed by each engine is carefully made up, and the full list, with mileage figures, is posted in the train yard, so that the engineers and firemen know exactly what each man and each engine is doing. This, it is to be assumed, establishes a spirit of rivalry among them, each being naturally anxious to get the best results.

In general operation, the boat at the dock supplies the storage. The coal is hoisted as nearly as possible at the rate at which or as fast as it is consumed. The main hopper, which has a capacity of many tons, provides for a considerable overrun. Besides this, there is a coal yard, to which as much of the coal as is desired may be delivered, and from which it may be hoisted by ordinary tip buckets.

The entire plant was designed by Lincoln Moss, assistant engineer of the Manhattan Elevated Railroad. The coal hoisting and delivering mechanism was designed by and supplied by the C. W. Hunt Company, of this city.

The Influence of Sugar and Tobacco on Muscular Effort.

In 1892 an important series of experiments were undertaken by Dr. Warren Lombard upon the influence of tobacco on muscular effort. The same subject has been investigated by Dr. Vaughan Harley, and the results of his observations are recorded in the first part of the *Journal of Physiology* for the present year.* Dr. Vaughan Harley agrees with Dr. Lombard in considering that the amount of work done by the same set of muscles at different times of the day undergoes periodical variation; so we may accept as a fact that there is a diurnal rise and fall in the power of doing voluntary muscular work, in the same way as there is a diurnal rise and fall in bodily temperature and pulse. It is remarkable, however, that instead of the greatest amount of work being done, as might have been expected, on rising in the morning, after a good night's rest, it is found that at 9 A. M. the smallest amount of work is accomplished, the powers of doing muscular work in Dr. Harley's case increasing each hour up to 11 A. M.

Immediately after lunch there is a marked rise, followed an hour later by a fall, while again an hour later, or about 3 P. M., the amount of work accomplished reaches its maximum. Then, from some unexplained cause, there is a notable fall at 4 P. M., which is succeeded by a rise at 5 P. M., after which a progressive fall takes place during each successive hour until dinner. Even during a prolonged fast more work was capable of being executed from 11:30 A. M. to 4:30 P. M. than at 9 A. M. Dr. Harley admits, however, that further experiments are required to determine this point satisfactorily. It was found in his experiments on the muscles of the middle finger that, in corroboration of a well known physiological fact, regular exercise caused increase in the size of the muscles brought into play, and at the same time up to a certain point rendered them capable of performing more work. Sugar, taken internally, proved to be a muscular food, since, when taken on an empty stomach, there was on that day an increase of 25·6 per cent in the work done by the left middle finger, while the right middle finger showed an increase of no less than 32·6 per cent. Dr. Harley varied the experiment of administering sugar in many different ways, but always with the same result. The vigor of the muscles was always augmented. The influence of tobacco was not so marked in Dr. Harley's experiments as in those of Dr. Lombard. Dr. Harley considers that moderate smoking in one accustomed to it neither increases the amount of work nor retards the approach of fatigue. It, perhaps, slightly diminishes muscular power and hastens the onset of fatigue. Dr. Lombard holds that the use of tobacco has a powerful influence in this direction.

Such experiments as these, even when no absolutely definite result is arrived at, are of importance, and if carried out, with due precautions against error, in a large number of men would undoubtedly constitute the most satisfactory basis on which a sound system of training should be carried out.—*The Lancet.*

* Both Dr. Lombard's and Dr. Harley's experiments were performed in the same way, viz., by connecting the middle finger by a cord with a weight running over a pulley and ascertaining the distance through which the weight could be lifted in a given time.

Dangers that Lurk in Flowers.

According to the *N. Y. Sun*, science has succeeded fairly well in making humanity shudder over every bite or sup it takes, because of the deadly microbes that are said to abide in everything eatable or drinkable, and now it has started off on an entirely new crusade. You mustn't smell flowers now, or, if you do, you take the consequences which science says this æsthetic pleasure entails.

A very learned French specialist, M. Joal, has just issued in Paris a treatise bearing the title "Le Danger des Fleurs." He writes most profoundly of the chemical decomposition of the atmosphere caused by the odors given off by flowers, and the consequent great increase of carbonic gas; of the partial asphyxia which results to human beings breathing this vitiated air; and of the poisoning of the system caused by inhaling the emanations of the essential oils contained in flowers. He backs up his assertions as to the subtile viciousness of flowers by citing individual cases.

M. Joal says the smell of flowers is especially injurious to the vocal organs. The rose, and others flowers with a strong scent, should, he protests, be avoided. He knows of operatic singers who have completely lost their voices through their passion for certain flowers. To some persons the perfume of the violet is particularly injurious. Others should avoid the lilac, and others the gardenia. Personal susceptibility has much to do with the injurious effects that may result from smelling certain flowers, and M. Joal cannot, therefore, say what particular flowers should be avoided by certain temperaments.

The writer cites a case of a young woman who used invariably to faint at the smell of orange blossoms. The curious conjunction of a susceptible young woman and a bridal wreath in this illustration might lead to the supposition that there is more in the case than M. Joal makes apparent. He tells of a soldier who lost consciousness under the effect of the odor from a peony, and alleges that persons have been known to suffer a violent attack of coryza from smelling roses. It is suggested that a great percentage of the headaches, colds in the head, and the like ailments from which people, especially women, suffer, on the morning after attending a ball, dinner party or other social function, is a direct result of the odors of the floral decorations. This will, at least, be useful in supplying a new excuse to the man who wakes up in the morning with "a head."

As to the evil effect of flowers on the voices of opera singers, the teacher Faure, in his work on the voice and singing, cautions singers against keeping flowers in their homes or in their dressing rooms at the theater. Mme. Richard, of the Paris Opera, forbids her pupils to have flowers about them, and it is asserted that Mme. Krauss, one of the star singers now at the Opera, refuses to stay in a room with a bunch of violets. Another singer can stand the smell of roses, but the perfume of lilacs makes her hoarse. Even Mme. Calve is cited as saying that she suffers from dizziness and headache after sitting in a room containing tuberoses or mimosa. She is quoted as giving an instance where, after singing at a concert, she received a bouquet of lilacs, and after inhaling the perfume a minute or so, she completely lost her voice, and did not regain it until she had taken a walk in the open air.

This suggests a serious consideration of the custom of presenting bouquets of flowers to singers, or of sending boxes of flowers to one's best girl. In fact, if M. Joal knows what he is talking about, science's new crusade means revolution, as well in the world of fancy as in that of fact.

Prof. Romanes.

Science has sustained a severe loss in the death of Prof. Romanes. He was born in Kingston, Canada, in 1848. His boyhood was passed in England, France, Germany and Italy, and he was educated by tutors and in private schools. In 1867 he entered Gonville and Caius College, Cambridge, where he graduated in 1870. In 1873 he was Burney prize essayist and was Croonian lecturer to the Royal Society in 1875. He was made a fellow of the Royal Society in 1879, after publishing valuable papers on the Medusæ. The University of Aberdeen conferred the degree of LL.D. upon him in 1881. He was early acquainted with Darwin and never ceased to be an enthusiastic member of the Darwinian school. Prof. Romanes published many works on natural history and was well known as a lecturer before the Royal Institution, the Royal Society and other learned bodies.

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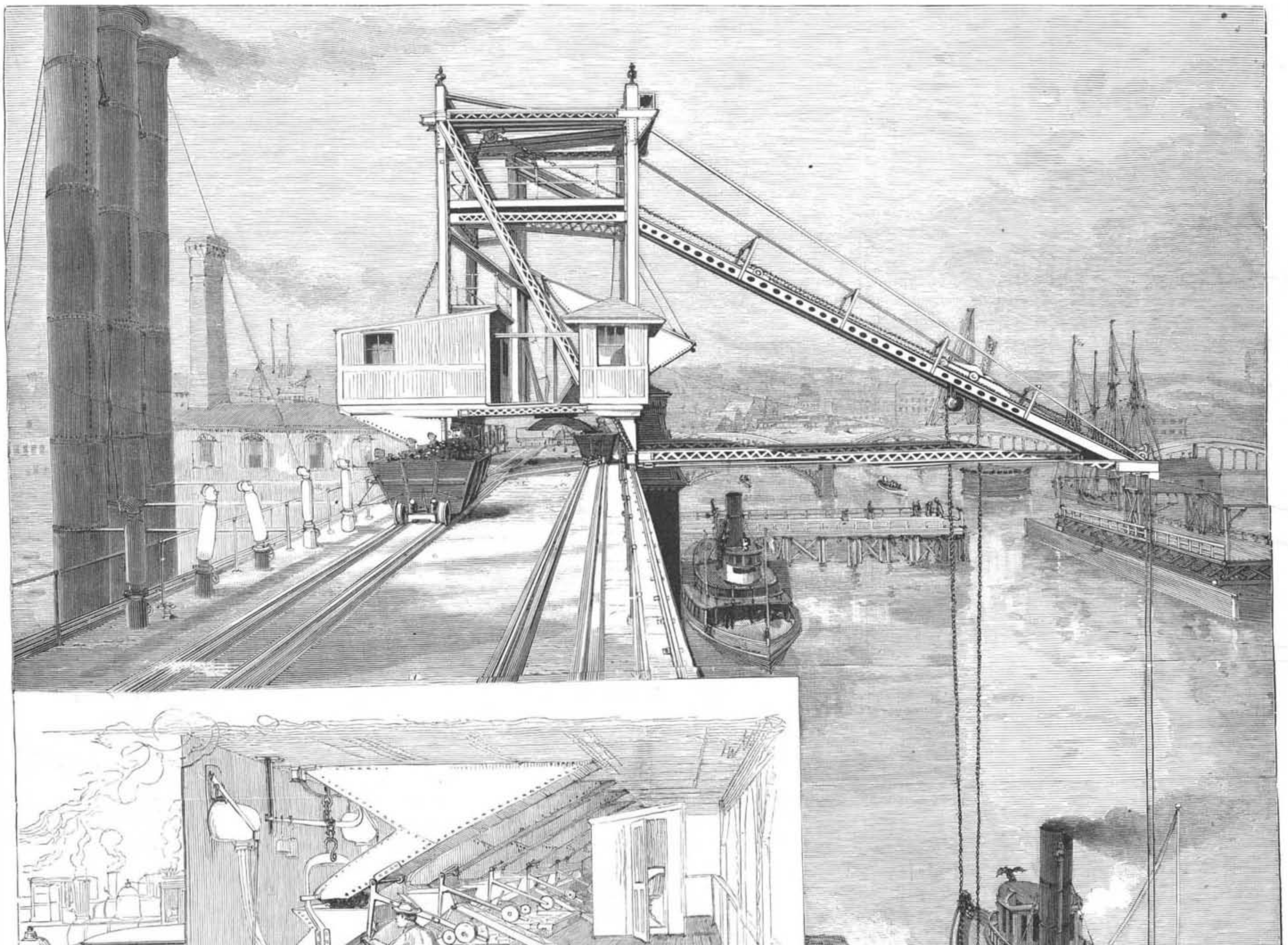

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