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TALL CHIMNEY ENGINEERING.

Some very striking examples of the resources of engineering have been furnished by the treatment of tall chimneys, in some cases the tragic side of the profession coming into relief. The problems presented for solution by these structures are difficult. It often happens that a chimney settles a little on one side, and becomes dangerously inclined from the perpendicular. In such a case it has to be straightened. Sometimes the operation is successful, but in a number of instances the chimney has fallen after the operation.

Probably the worst of these accidents on record happened in the case of Newland's mill chimney, Bradford, England, a shaft rising 260 feet from the top of the foundation. When it was nearly completed, it was found to be bulged on one side and hollow on the other. The settling occurred during a single night. To straighten it, two cuts were made extending about one-half around it, which, as fast as made, were filled with stone one-half inch less in thickness than the cut. Iron wedges were driven above the new stone to take the weight. The cuts were made little by little, so that no change occurred until the wedges were knocked out. The chimney then settled down on the side where the cuts were, and was straight. It was then completed. Nine years later some cracks appeared and were repaired. Again, after ten years more had elapsed, some pieces of the outer casing dropped off, and two days later the whole upper portion of the chimney fell, killing fifty-four persons and doing about \$100,000 worth of damage. Just before the collapse stones and mortar were observed to burst out from the locality of the cuts.

In the neighborhood a successful operation of the same character was performed. A chimney at Bingley, near Bradford, was found to be four feet six inches out of perpendicular. A gap a foot high was cut clear through one side of it. Screw jacks were inserted in the cut as fast as the cut progressed, and as each was put in place it was screwed up hard against an iron top plate. A similar plate was placed under each jack. When about half the circumference of the chimney was cut through, the jacks were slowly turned down until the chimney was nearly straight. The gaps between the jacks were bricked up, the jacks were taken out one by one, and masonry was put in their place. When all were removed the shaft was perfect, the compression of the new work having completed the straightening.

In another instance a chimney 132 feet high settled until its top was 3 feet 2 inches out of the perpendicular. This was at the works of Matthews & Sons, in Gloucestershire. A course of bricks was taken out for five-eighths of the circumference and replaced by a course 1 1/2 in. less in height. As fast as the cut was made the new course was laid and iron wedges were driven in above it. When all was in place, the wedges were driven out, and the chimney came back to within an inch or two of the perpendicular.

Chimneys will stand these operations if of good material originally; but if the brick and mortar are inferior, they will be apt to succumb. A shaft in Oldham was being straightened in the above manner. The owner protested, taking the ground that the mortar should alone have been sawed, and went off a little distance with one of the workmen to observe it, when suddenly the pile fell, burying one man in the bricks and destroying an adjacent building. The brick and mortar were both of inferior quality.

It is by no means the universal custom to treat the problem in so radical a manner as by the removal of a portion of the bricks or stones. Often the mortar between two of the courses of brick is sawed out on the higher side and the operation is repeated on the other joints until the work has been completed.

The moving of a chimney has been successfully accomplished. In Brunswick, Maine, a seventy-eight foot chimney was moved twenty feet on greased planks. It weighed about 100 tons. Inside of nine hours it was again at work in its new position, receiving the products of combustion from the fires.

The erection is generally conducted by the ordinary methods in use in regular building. Sometimes a radical departure is made. An iron chimney over 150 feet high has been built from the bottom upward. A section of the chimney twenty feet high was first built. This was raised vertically four feet, and a circle of plates four feet high was riveted to it at the bottom. The whole section, now twenty-four feet high, was lifted again four feet, and a new course was riveted on, and this was continued until the whole was complete. A hydraulic ram did the lifting. Of course this method could not well be applied to other than a sheet iron shaft.

In the demolition of a high chimney some ingenuity can be shown. A chimney in Middlesborough, England, was taken down brick by brick from the top downward. A long chute one-half an inch longer and wider than a brick in its cross sectional dimensions was first erected within the flue. It was air tight and rose from an air tight box placed at the bottom of the chimney. The bricks were dropped one by one through this chute, and were cushioned by the air so

that none were broken or injured. From time to time the box was opened and the bricks that had accumulated were removed.

THEATRICAL EMOTION.

Who, sitting at the play, has not wondered if those portraying passion were not moved at their counterfeit presentment—so real it seemed. There's the man in a passion, actually red in the face and trembling visibly; the mother weeping over her child. How true it seems! If she be not crying, there is every evidence about her of profound grief. See how she throws up her arms as though appealing to the heavens for aid; watch the muscles of the face, the expression of her eyes, and note the depth of feeling in that sigh she fetches. Is all this but simulation? So it has often been alleged; only theatric trickery. Now, however, comes a medical authority who insists that no one can simulate passion truly without feeling it—at least to a certain extent. He says that the players themselves will sustain his assertion—the best proof of all being that, from the earliest days of their apprenticeship, they were bidden to imagine themselves the personages they would counterfeit.

Any one who has ever been before the footlights when a company was being drilled will remember the frequent recurrence of such remarks as these by the stage manager: "Mr. Jones, you're not feeling the part, you're only acting it. No man ever looked as you do when he was really mad. Miss Smith, you would not cry in such a happy-go-lucky fashion, were you really cast adrift on a deserted island. Try and imagine such a condition; think of your forlorn state, the fact that you are not likely to see home and friends again. Perhaps you will starve, or be eaten by wild beasts when night comes"—and so on.

Another authority, in a recent paper on the subject, takes the opposite view, insisting it is all mechanical. He says: "By long practice we are enabled to intervene between the psychological and the muscular or vascular conditions. Our social education accustoms us, from infancy upward, to the exercise of some sort of control over the exhibition of the emotions, and to the well-trained individual it is comparatively easy to prevent his face divulging his thoughts and feelings. In the same way actors gradually become enabled to tear a passion to tatters without showing the emotion to which their mimicry gives rise in the onlookers. An actor who really wept or really laughed would be as little fitted for his task as a medical man who really experienced the sympathy which his speech and manners are intended to convey. Not that there is anything hypocritical in either case, but both have acquired the ability to disassociate the feeling from its normal manifestations. From a theatrical point of view, it is surprising what education and practice can do toward converting into voluntary acts phenomena which, in other people, are utterly beyond the sphere of the will."

NEW ANIMALS AND BIRDS IN THE CENTRAL PARK.

The leather turtle, newly come to the Central Park collection from southern Texas, is so rare that none has been shown here before, and so curious as to well repay a visit to the pigeon house, where, in the little pool, he lies for hours blinking lazily; the birds coming down to its edge to drink keeping one eye on the dull, sodden-looking creature, with vampire-like beak and telescopic neck. A keeper brought him into Superintendent Conklin's room one afternoon last week, and as he made off for a dark corner, his back—he is about eighteen inches long—moved in rhythmic waves with every movement. Instead of shell and bone, like other turtles, it is elastic and ductile. Indeed, you can almost double him up, even the frame seeming more like cartilage than bone. He is said to be as toothsome as green turtle, is found in fresh water, and was given to the Park by Mr. J. W. De Peyster.

There are now a pair of wild Barbary sheep (*Ovis trangelaphus*) in the inclosure near the Arsenal. They are very young, but when full grown will be quite as large as Rocky Mountain sheep, standing about four feet high. The wool is fawn-colored and short. The ram has a great mane, and his fore legs well feathered. The horns are long, heavy, and curving.

A South American deer of the red variety was recently given the Park by Dr. Spitska.

There is a cow blackbird in the bird house, brought to this port by a ship of the Hamburg line of steamers. When the ship was fully 800 miles off the coast, this bird flew aboard during a November storm. It seemed utterly fagged out, alighted first on the main truck, and then, as if its strength was near gone, almost tumbling down the yards to the deck, where it lay feebly fluttering.

A large rough-legged hawk from the Rocky Mountains (*Archibuteo Sancti Johannes*) has been given by Dr. Francis Martin, of Boston. It was taken from its nest by the Indians, and is said to be a rare specimen.

Only three elephants remain, and these are kept chained to the hard floor of the antelope house. So nervous this unnatural imprisonment has made them, that now and then one or the other shows signs of