

## TALL CHIMNEY CLIMBING.

There are several agencies at work upon tall chimney shafts tending to deteriorate them, and necessitating an occasional inspection of the condition of the upper portions of the brick work of these structures. The material used is of a perishable nature, and, as a matter of course, in time the bricks and mortar or cement crumble away under the insidious attacks of wind and rain. Not uncommonly the interior of the chimney is full of highly-heated vapors, which exert a powerful disintegrating action. The top of the chimney is also exposed to strokes of lightning, which, under the system of imperfect protection often adopted, contributes in a material degree to the gradual loosening of the brickwork. Hence the necessity for occasional inspection. But the difficulty and also the expense of such examinations have probably been at the root of a neglect which in some cases has led to the fall of the structure. A notable instance of this occurred two years since at a mill in a suburb of Bradford, England, where a chimney 240 feet high fell, killing 30 of the workpeople and injuring about 40 more who were engaged in the spinning and drawing sheds beneath. The chimney had been built about twenty years, and was known to be out of repair; in fact, it was under repair at the time of its fall. The plan adopted in the earlier days of tall chimneys for gaining access to their tops for the purposes of examination and repair is deserving of some praise on account of its ingenuity. A kite was flown by a trained and skillful hand over the top of the chimney until its string was placed obliquely across the orifice of the shaft, and the kite was then pulled down to the ground by a second string attached to the one which was used in managing and controlling the flight, leaving in this way the string looped over the top. The kite being then removed, a stout cord was attached in its place and drawn over the top of the chimney until the cord had taken the place of the string, rising from the ground, crossing over the mouth of the chimney, and descending to the ground on the other side. This process was then repeated, stouter and stouter cordage being used each time, and finally a strong iron chain, until at length a tackle was raised and fixed, from which an adventurous workman, generally known as a steeple jack, could be pulled up to complete the adjustments and attachments of more reliable machinery above. In most of the large chimneys of this earlier date upwardly-curved hooks of iron were left fixed at the rim in a position conveniently arranged for catching the kite string.

We need hardly observe that some skill is required for the attainment of distinction in the art of kite-flying for getting at the tops of tall chimneys. Some years ago Mr. Solomon Sanderson, of Huddersfield, England, acquired a high reputation for his successful practice of this craft. He contrived the means which have now practically superseded the use of the kite. One great disadvantage of the kite-flying process was the delay that continually occurred in getting the tackle attached to the top of the chimney by its instrumentality. A firm who had undertaken a work of reconstruction or repair very naturally hesitated to send a staff of workmen to any distant place until there was good assurance that they could at once enter upon their task. A kite-flyer was therefore dispatched as a preliminary measure, to establish a practical connection with the chimney top. But when this *avant courier* was once well away from the superintending eye, it seldom happened that a favorable wind could be secured. The public-houses of the place, which naturally became the refuge of the kite-bearing artist and messenger, appear to have exerted some very curious meteorological influence upon the direction and force of the currents of the air. Weeks, and in some special instances months, would slip by before a favorable and manageable breeze would present itself for the raising of the kite. It was in these embarrassing circumstances that Mr. Sanderson determined to contrive some upward path that would be independent alike of the caprices of the wind and the seductions of the drinking shops. He succeeded in his design, and about 17 years ago he introduced the ingenious method of getting at the tops of tall chimneys which is now largely adopted.

The method devised by Mr. Sanderson consists in pushing length after length of short segments of a ladder, as it were telescopically, up against the perpendicular face of the shaft of the chimney, and of climbing simultaneously upon the lengthening-out ladder as it goes. This would appear to be a somewhat formidable proceeding when employed upon a chimney 250 or 300 feet high. It is one, however, which has been so perfected by the inventor and his successors that it is now

employed, in the hands of good climbers, with an almost complete immunity from dangerous risk. The ladders used in the process are 15 feet in length, and they are so made that the bottom of any one ladder can be dropped into sockets provided at the top of any of the rest. Pegs about 8 inches long, which project out from one face of each segment of ladder, serve the purpose of keeping it that distance from the brickwork when it is fixed, and of providing a secure foothold and handhold. The first step consists in placing one section of the ladder, standing perpendicularly upon the ground, against the base of the chimney. An iron holdfast is then driven into the brickwork 1 foot up from the bottom of the ladder, and 1 foot down from its top. These holdfasts are of a hooked form, so that they can each be made to clamp one of the rungs of the ladder when they are driven home upon it into the brickwork. When one segment of the ladder has been thus firmly attached to the shaft of the chimney, a free ladder is sloped against it, and the climber then ascends upon this until he can reach about 1 foot above the top of the fixed segment. He there drives a holdfast and attaches to it a pulley and block, so that one end of the rope reeved into the pulley can be brought half down a second loose section of the ladder, placed perpendicularly and side by side with the first. The rope is there fastened at midway height, and by means of the block the second section of the ladder is hauled up by men standing upon the ground until it projects half-ladder height above the section No. 1. In this position it is temporarily lashed to the fixed section, rung to rung, so that the climber can mount to its top and drive a holdfast into the brickwork a foot above its upper extremity. He then shifts the pulley and block to this upper holdfast, and descends to the ground. Section 2, still attached to the rope at its middle part, is then hoisted up to its full height above Section 1. The climber, following its ascent, next inserts the bottom of its sides into the sockets at the top of Section No. 1, mounts upon its steps as, still held by the pulley, it leans against the chimney, drives home two hooked holdfasts, clamping its rungs to the chimney, near the bottom and near the top; and, this having been done, the second section remains fixed in continuation of the first, and the ladder attached to the brickwork, and affording a practical way to the climber, has thus grown from 15 to 30 feet of continuous height. The process is then repeated with succeeding sections of the ladder until a perpendicular path has been construed from the bottom to the top of the chimney.

There are three essential points in this ingenious process which furnish a ready explanation to its success. The first of these is the temporary lashing of each section of the ladder when it is half way up, so that the climber can get safely to the top, as it is held still attached to the pulley, and fix a fresh block above its upper extremity for the accomplishment of the second half of the hoist. The second point is the joining of the sections by sockets as each one is placed in position upon the one beneath; and the third, the fixing of each section, when it is once lifted into its place, by holdfasts driven into the brickwork of the chimney. The ladder virtually creeps up to the top of the chimney, joint above joint, and fixes its tenacious fangs into the brickwork as it goes. The process is so so easily performed by practiced hands that the highest chimneys are scaled in very brief spaces of time. As an example of the rapidity with which the work can be performed, we find it stated that the chimney at the Abbey Mills pumping station of the Metropolitan Sewage Works, London, England, some 230 feet high, was laddered from the ground to the summit in three hours and a half, about a year ago, when some repairs were being carried out.—*Ex.*

## LARGEST OF THEIR KIND.

The largest ocean in the world is the Pacific; river, the Amazon; gulf, Mexico; cape, Horn; lake, Superior; bay, Bengal; island, Australia; city, London; public building, St. Peter's, Rome; hotel, Palace, San Francisco; steamship, "Great Eastern"; desert, Sahara; theater, Grand Opera House, Paris; state, Texas; highest mountain, Mt. Everest, Hindostan, Asia; sound, Long Island; railroad, Union Pacific and Central Pacific; canal, Grand Canal, China; bridge, that over the Tay at Dundee, Scotland; railroad depot, St. Pancras, London; largest room in the world under single roof, on military, St. Petersburg.—*Ex.*

WATER filtered through charcoal becomes perfectly pure, the charcoal absorbing all disagreeable tastes and smells, whether they arise from animal or vegetable impurities.