

Chimney Felling.

BY WALTER WOOD.



LOFTY chimney-stack which has taken several months to build can be made a heap of ruins in less than twenty hours. The special process of demolition by which this result is attained is simplicity itself. The greater part of the base is removed, and stout props are inserted to keep the shaft temporarily erect. The props are rapidly burned by a fire of intense heat, and as soon as they collapse the structure falls. Given space in which he may do his work, an expert steeple-jack will bring a chimney down without damaging either life or property. Many shafts are so built that they cannot be destroyed except from the top. There is not enough room in which to fell them, their immediate vicinity being too thickly crowded with buildings. In such cases scaffolding must be erected, and the work of destruction is naturally much slower and far more costly than that of razing a stack.

The work of felling chimneys has been carried by one expert to a state of much perfection. That expert is Mr. Joseph Smith, of Rochdale, known throughout the great chimney district in which he lives as the "Lancashire Steeple-jack." He is perhaps the only man in England who has made a speciality of felling chimneys, as felling is now understood. He has overthrown nearly fifty stacks in various parts of the country, and in carrying out his dangerous tasks has never had an accident either to himself or any member of his staff. No stack is too high or too heavy for him to grapple with—the bigger the game the better the sport. As I have said, however, not every tall chimney that has been condemned can be felled; many of them must be brought down brick by brick or stone by stone, so that there is some limit to the class of structure which can be razed

with safety. The greatest shaft which Mr. Smith has felled rose nearly 240ft. above the ground, and contained about 500 tons of bricks. This, with the help of three men, he totally destroyed in eighteen hours.

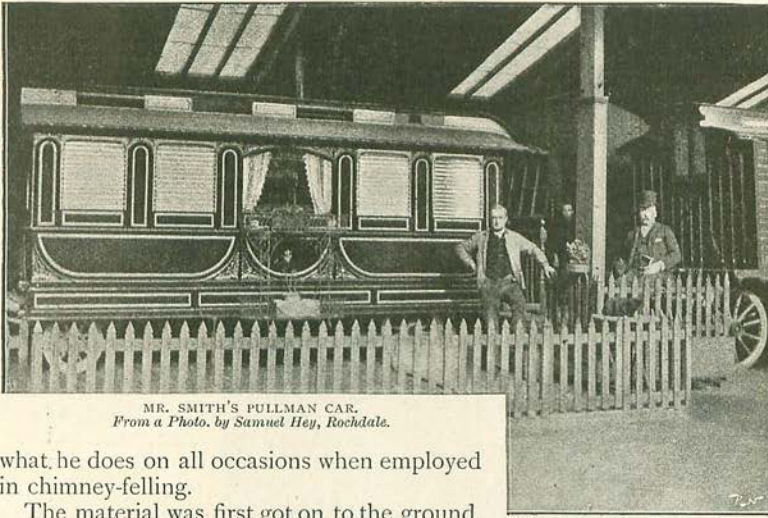
Simple as the steeple-jack's mode of working is, uncommon nerve is needed in order that it may be carried out successfully. Mr. Smith does not know what fear is, but he is by no means callous. He is a man of kind and genial nature and many hobbies, one of which is the running of a very successful variety circus. It is not long since the "Lancashire Steeple-jack" lived in a luxuriously-furnished Pullman car, which was specially built for him, and of which a photograph is reproduced on the next page. For many years, when engaged on chimney work in different parts of the country, he took with him a smaller caravan, in which he dwelt until his return home. One of his chief reasons for taking, like the snail, his house with him, was to insure sleeping in a properly aired bed. He has, like all wise men, a horror of damp sheets.

When Mr. Smith is commissioned to fell a chimney, he first visits and thoroughly examines the structure. For his labours he likes best a stack which is near open ground,

so that he can arrange for the *débris* to descend upon it. The last piece of work of this description done by him was, from his point of view, an ideal undertaking, inasmuch as the chimney stood in a field, and there was ample room on two sides for the reception of the ruins. The shaft to be destroyed was just outside Walsden Station, in Lancashire, and Mr. Smith had been instructed by the Lancashire and Yorkshire Railway Company to fell it. As I was present at the operation, and as this particular "fall" showed the expert at his best, I will describe it. What he did then was exactly



MR. JOSEPH SMITH, THE LANCASHIRE STEEPLE-JACK.
From a Photo. by Henderson & Co., Rochdale.



MR. SMITH'S PULLMAN CAR.
From a Photo. by Samuel Hey, Rochdale.

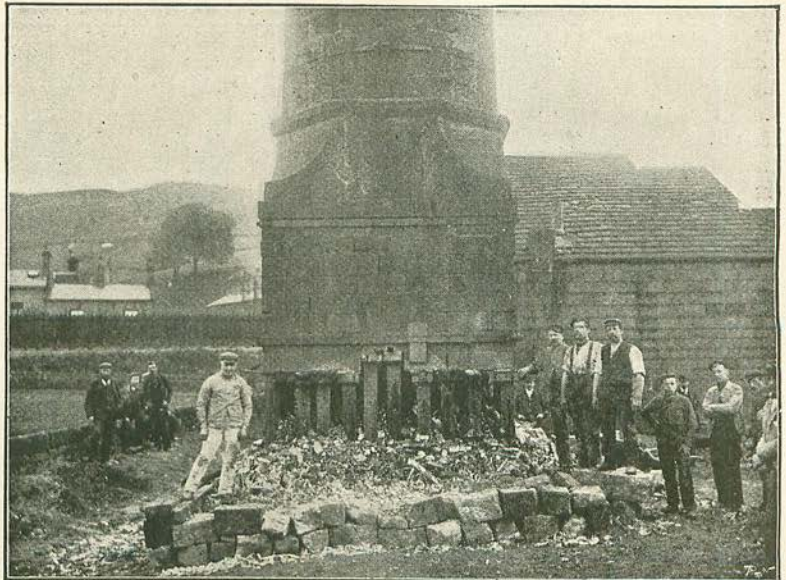
what he does on all occasions when employed in chimney-felling.

The material was first got on to the ground. This consisted of between thirty and forty stout props of timber, about 5ft. long, a ton of coal, a quantity of solid pitch, a barrel of tar, two barrels of paraffin, and some shavings. The quantity of inflammable stuff varies according to the size of the chimney to be brought down—sometimes it is more and sometimes less than that which has been given. Having conveyed the material, the base of the chimney was measured, and a careful calculation made as to the extent to which it was advisable to cut away for the insertion of the props. The base was 10ft. square, and, like the rest of the structure, which was round, was built of large blocks of good stone.

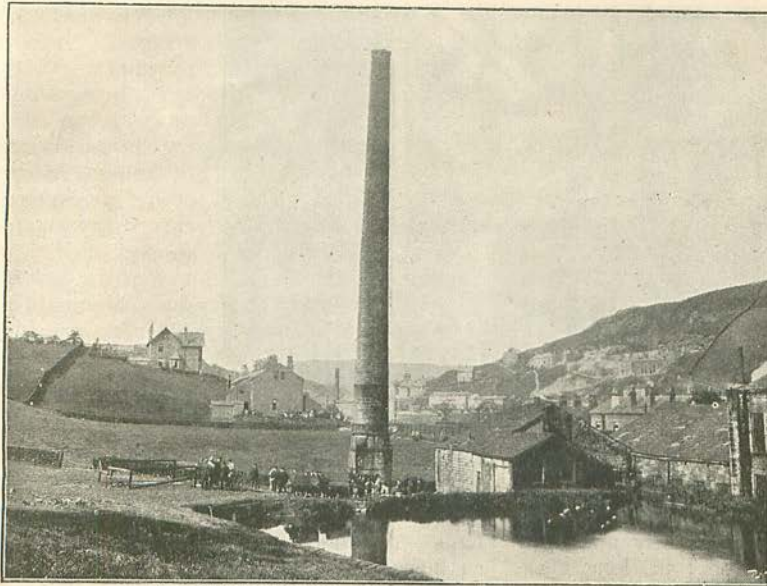
First of all, a portion of the base on the right side was cut out and a prop was at once inserted to replace the stones. A similar cut was made on the left side, and gradually and very carefully the entire front of the base was removed, as well as a considerable part of the right and left sides, the props being put in immediately after the stones had been removed.

The props were arranged horizontally and vertically, the horizontal props being next the lowest course of stones. As the stones were taken out they were formed into a low wall at the foot of the chimney, in order to make a fireplace for the coal, tar, and paraffin. Some of the *débris* was made into a wall inside the chimney itself, so that the flames should be confined to the props and as little of the heat as possible allowed to escape up the stack.

When the propping of the chimney had been completed the fire was laid. Building the fire was a work of art, and Mr. Smith in this as in all things exercised the greatest personal care. He superintended every detail, and wherever there was an element of unusual danger, he took the matter into his own hands. He put an extra lump of pitch here and a lump there, an extra piece of coal at this spot and another at that. Each prop was thoroughly saturated with paraffin,



THE WALSDEN CHIMNEY—INSERTING THE WOODEN PROPS.
From a Photo. by Henderson & Co., Rochdale.



THE WALSDEN CHIMNEY—THE STACK READY FOR FALLING.
From a Photo. by Henderson & Co., Rochdale.

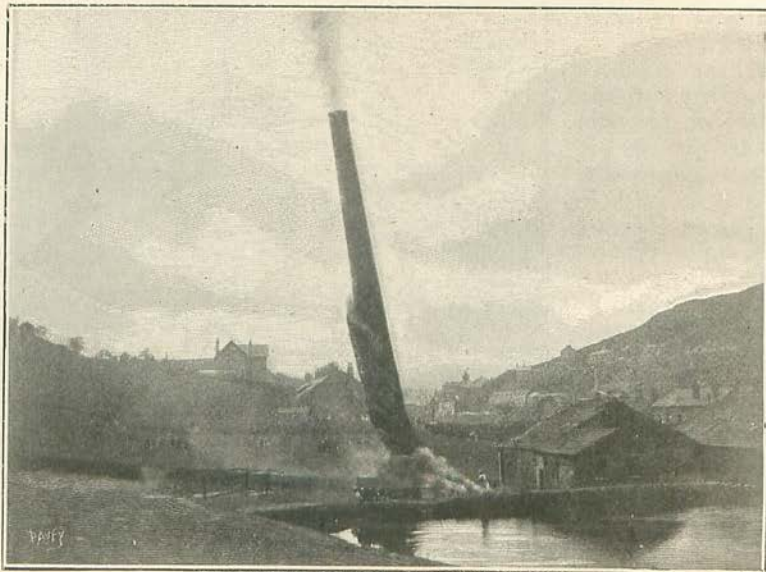
and pailful after pailful of the liquid was thrown upon the mass of combustibles. One very important detail was the boring of a couple of holes in nearly every prop. This device does not weaken the supporting power of the timber, and yet it causes the fire to burn through much more quickly than would be the case without the holes.

"When we've got all the props in," Mr. Smith explained to me, "the chimney 'gives' a bit; that is to say, it settles on to the props, and a slight crack appears behind, in the remaining solid part of the structure. When we see that crack we know for a certainty that the props have 'got it.' If, after having got the props fixed, I find that they haven't 'got it,' I take a little bit more of the base out, until I am certain that the props have the whole weight of the chimney upon them. To get the entire weight resting solely on the props is a most essential feature of the work, for as soon as

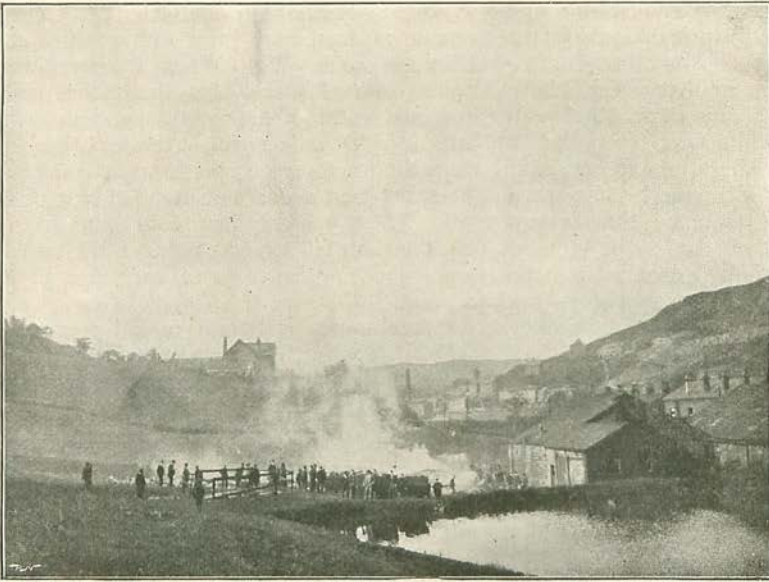
the fire has burned the timber through, the chimney must be absolutely free to fall. There must be nothing whatever to give support enough to allow it to remain standing."

The weight of the chimney at Walsden was about 200 tons, and the height was 135ft. Everything was in readiness for lighting the fire in sixteen hours after the first stone had been taken out. At that time there was a strong gusty wind, and as I was talk-

ing with the steeple-jack at the base, I could not rid myself of the idea that the whole structure would come upon us. Mr. Smith readily admitted that the shaft was "rocking a bit," but he scouted the suggestion that it would descend before its time, and expressed his willingness to sleep under it if necessary. He invited me to examine the chimney through a pair of small but powerful field-glasses, and I walked some yards away with him and did so. The aspect was startling.



THE WALSDEN CHIMNEY—THE STACK FALLING.
From a Photo. by Henderson & Co., Rochdale.



From a Photo. by THE WALSDEN CHIMNEY—AFTER THE FALL. [Henderson & Co., Rochdale.]

There were numerous cracks in the side, and a total absence of mortar between the stones. The rain and wind of eighty years had effectually destroyed the cementing qualities of the material, and it was evident enough that it was time for the chimney to be laid to rest.

The critical moment having come for lighting the fire, the steeple-jack ordered everybody away to places of safety, keeping near him only a tried assistant, and even his services were soon dispensed with. A match was put to the shavings, and instantly the flames were roaring and leaping about the base of the chimney, and a dense cloud of smoke burst from the summit.

The work of the steeple-jack was by no means done when he had applied the match. The most critical part of his task had to be accomplished. This consisted of feeding the fire with paraffin and liquid tar, so that the props should burn equally and collapse together. Pailful after pailful of the liquid was thrown upon the blazing mass, the steeple-jack going in front of the chimney in a manner which caused the spectators to shudder lest the stack should fall upon him. Every time a pailful of oil or tar was dashed upon the fire there was an immense sheet of flame, accompanied by a black cloud of smoke and a roar as the fierce heat swept up the chimney, in spite of the protecting wall that had been built in the interior. Some of the smoke burst out of the old stack's side in long, snaky folds, and made a wonderfully fascinating picture.

The flames burned furiously for nearly twenty-five minutes. Then Mr. Smith flung on his last pailful of paraffin, and in obedience to the ominous crackling of the shaft, he retired from the immediate vicinity of the base, and waited at a few yards' distance for the fall.

The steeple-jack waved his hand as a signal that the end had come, and an instant later the base of the chimney burst out, and the stack

came down in telescopic fashion, with a rumbling noise like distant thunder. About 30ft. from the ground there appeared a yawning fissure, and the chimney above that for some 30ft. was a mass of crumbling stonework. The top part, for a length of some 60ft. or more, remained intact almost until the ground was reached, but as it struck the earth it was dashed to pieces, and not two stones of the entire shaft held together when the "fall" had been completed.

The accompanying photographs by Messrs. Henderson and Co., of Rochdale, give an admirable idea of the operation. The first shows the chimney after it had been prepared for "felling"; the second is a picture of the base a few minutes before the fire was lighted, the third shows the shaft in the act of falling, and the fourth is a representation of the scene immediately after the work was done.

It is no part of the "feller's" duty to remove the *débris*. His sole task is to bring the chimney down. As a rule, the owner of the stack furnishes the material for the fire, and arranges for the taking away of the ruins. Considering the skill required and the danger run in felling a chimney, the price asked for the work seems absurdly small. The cost of the operation varies from £10 to £20, according to the size and location of the shaft.

The method of subverting all chimneys, whether square, round, or octagonal, is the same. In the case of an octagonal structure the whole of five "cants" are cut out—each

side is called a "cant"—while with round stacks a corresponding proportion of the base is removed.

Felling such a stack as that which I have described, or, indeed, any shaft which can be laid upon a stretch of open ground, is a tolerably easy undertaking to the steeple-jack. He has much more difficult work to do when he wishes to raze a chimney that is surrounded by buildings and has to be brought down within a very limited area. Give the "Lancashire Steeple-jack" a radius of twenty feet, however, and he will collapse a chimney in an almost perpendicular fashion.

In such a case the system of propping is more elaborate than that for chimneys which are to be felled on open ground. The entire base is cut away, and the stack is supported only by the timber. It is necessary to lay the fire with the utmost care and nicety, and to feed the flames so that the whole of the props shall collapse at the same moment, and allow the chimney to settle down on the spot where the base has rested. As it falls, the chimney telescopes, and, as a rule, forms itself into a great heap of brick or stone over the foundations.

Asked if a chimney could not be brought down within an even less area than 20ft., Mr. Smith replied, "Some men might say 'yes,' but, for my own part, I should not like to try and, at the same time, guarantee safety. I always say that he isn't a good carter who has an accident every time—he is the best who brings his horse home safe, even if he is a bit longer over the journey. I can," he added, with a touch of pride, "bring down in seventeen hours a chimney that has taken three months to build."

It is essential that the man who is felling a chimney should remain at the base until the last moment, so that he may see that the fire is properly fed and that the stack falls upon the spot which has been mapped out for its reception. The place upon which the *débris* will alight can be told with great exactness. At

Walsden Mr. Smith indicated to me a couple of imaginary lines within which the chimney would fall. When the stack had come down I found that the stones were confined within the precise space that the steeple-jack had shown. Another time he pointed out to some spectators a couple of trees between which he intended a stack to fall. There was only just room to receive it, but the shaft fell straight between the trunks, lopping off a few twigs of each tree in its descent.

"A chimney is bound to fall one way," said Mr. Smith, "and that is in the direction in which the cutting-out has been made. It will fall so, of course, if the fire is properly attended to and kept burning equally all round the props. The time occupied in burning through the props is from fifteen to twenty-five minutes. Chimneys vary but little in this respect, as the principle I adopt is the same in all cases."

"Which is the easier to fell—a brick or a stone chimney?" I asked.

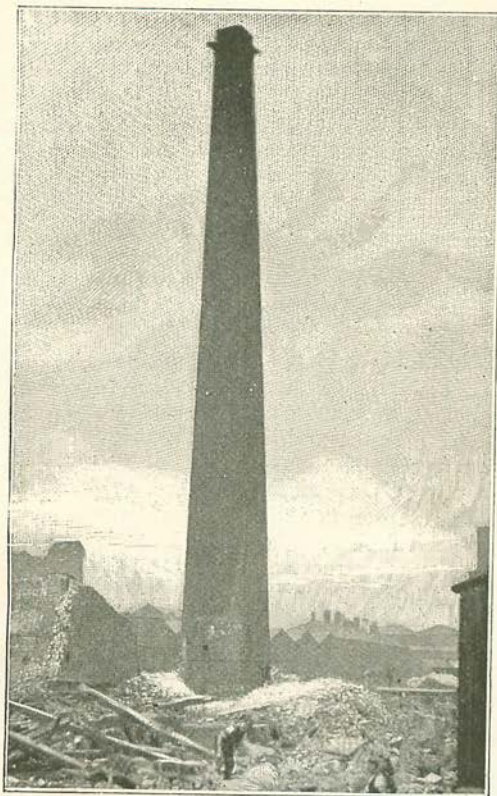
The steeple-jack answered, "I should say a brick, because they generally have an even 'bond,' that is, the crossing of the bricks. Look at a brick chimney, and you will see that the bricks are laid two ways, one with the long side and the other with the end facing you. The narrow ends show the bricks that make the 'bond,' as we call it. The bricks are simply laid at right angles. Stone chimneys, as a rule, are built with

good stone outside and rubble inside. You are more sure of the brick than stone chimney, because in getting your props in, the rubble might collapse and bring the stack down upon you."

A chimney may be levelled in any direction, according to the wish of the operator. If it is necessary to fell a square structure cornerwise, the task can be accomplished as easily as overturning the stack on to one of its sides. Only a few months ago Mr. Smith brought down, end-wise, a square chimney for the Bury Corporation. This was



From a Photo. by] FIRING THE PROPS. [J. O. Barrow, Bury.



THE BURY CHIMNEY.
From a Photo. by Henderson & Co., Rochdale.

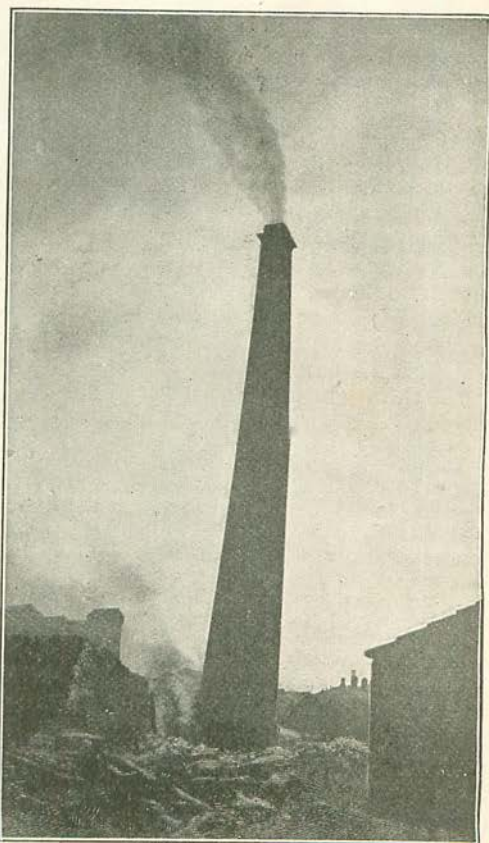
an old brick shaft 120ft. high, with a base 10ft. square, and a width at the top of 5ft. 6in. The structure was very much worn and shaken, and in order to prevent bulging the operator placed an iron belt round the stack a few yards from the base, a precaution which he always takes when the condition of the chimney needs it. This chimney fell, a complete wreck, about twenty-five minutes after the fire had been lighted. It buckled in the centre, and almost measured its full length upon the ground which had been prepared to receive it. A series of photographs of this "fall" are given. It will be noticed that a lady had the pleasure of lighting the fatal match. Mr. Smith is very gallant, and once invited a girl of ten to perform the interesting ceremony. The little maiden, however, begged to be excused. The towering subverted structure had a gloomy terror for her.

Sometimes a stack will topple over nearly intact, and the *débris* will cover a space about equal in length to the height of the structure. More often the chimney as it falls will break **into two or three parts**, the lowest of which will crumble upon the base and the rest turn **over**. In that event, the ground occupied

by the fallen material will be, roughly speaking, equal to about two-thirds of the height of the shaft.

When a chimney is about to collapse it gives what is technically called a "groan"; then the operator knows that the time has come for him to seek a place of refuge. He is content if he has a retreat covering an area of about 30ft., but the hair of most men would blanch at the idea of being so near the tottering mass. In the photograph which shows the collapse of the Walsden structure, Mr. Smith will be seen on the right, only just out of reach of the bursting base.

The "Lancashire Steeple-jack" has good cause to be thankful for a chimney's "groan." Once, when he was up a tall shaft at Chorley—which was greatly out of plumb—he heard the ominous sound. To hear it was almost to listen to the knell of death itself, and no man knew this better than Mr. Smith. He was then, as he is now, a man of wonderful activity, and like a cat he slipped down the life-line, and having reached the ground he fled from the falling mass. Long experience



THE BURY CHIMNEY FALLING.
From a Photo. by Henderson & Co., Rochdale.

had told him which way the stack would go, and even in that moment of supreme peril he did not lose his head. He had only got ten yards away when the chimney fell to the ground, on the side opposite to that by which he was escaping.

Incessant watchfulness is needed when a chimney is being prepared for a "fall," lest it should collapse before its time. With a tolerably sound structure little danger is to be apprehended, but with a worn and decayed pile the case is different. A year or two ago Mr. Smith was engaged to bring down a large shaft in Lancashire. It was a round structure, 180ft. high, with a base 13ft. in diameter, and weighed nearly 600 tons. The singular feature about it was that it was 4ft. out of the perpendicular. The expert knew that it would be almost impossible to keep the stack standing until the base had been removed and the props put in, but he did not shrink from making the attempt. This was an unusually dangerous and difficult operation, and his men were at work upon it for four days, preparing for the "fall."

On the fourth day he was employed at the base when he noticed sure signs that the end had come. He at once ordered everybody except two of his men to stand clear of the chimney, saying that it would be down in ten minutes. Like a good surgeon, he kept to his patient to the last. He and his men took out another cut from the base and then they made off to a post of safety. The shaft immediately fell in the desired direction. For once, at any rate, the help of the fire was not needed.

Generally speaking, if a small gap is made in the base a chimney will fall straight over, especially if the mortar is good and holds the bricks or stones well together; if a

large gap is cut, the stack will tumble partly over and then collapse. How it will exactly come down, whether in one mass and measure pretty nearly its full length on the ground, or in two or three sections, not even the most experienced man can tell. As a rule, however, the stack will buckle or break in one or more places and reach the ground in sections, but following so closely upon each other as to be seen separately only by a sharp and observant eye. The best eye of all for such a purpose is that of the camera.

Felling a chimney has many advantages over the method of demolition from the top. In addition to being much cheaper and quicker, the material of the shaft suffers less than if the removal is brick by brick or stone by stone. In many cases, of course, the material is so much damaged by the heat from the boilers and by the weather as to be mere rubbish; but very often, especially with stone structures, it can be used again for building purposes.

By way of showing the devastation a falling shaft can cause, a photograph is here reproduced of the damage done by the fall of the chimney at Marsh Mills, Cleckheaton, Yorkshire, on February the

24th, 1892, by which fourteen persons were killed. This shaft was being repaired when it came down. The chimney was 180ft. high, with a diameter at the base of 15ft. It was circular in form, was built of brick, and weighed about 500 tons. In this case the shaft crushed down for 60ft. or 70ft. before tumbling over on to the mill. This "crushing down," it will be remembered, is a special feature of the collapse of a chimney which has had the entire base removed and replaced by props that are to be burned through.



THE CLECKHEATON CHIMNEY DISASTER.
From a Photo. by R. J. Appleton & Co., Bradford.