

before the accident occurred, having (as I understood) fallen down from age. The upright is split vertically in two places, one (where the piece was rent off) following exactly the line of the small iron nails which fixed the laths (for the wall plaster) to the upright, and the other about 2 inches to the east of this line. At this east split the outer portion of the upright is forced outwards about 4 inches from the centre portion, and all but separated from it. Along the line of the first split the lath nails are forced out of the upright, and the lath ends pushed outwards, and some broken off. A great patch of the plaster that covered them (the centre of it being about 4 feet above the floor) is torn off and thrown violently against the north wall of the building on the opposite side of the room 21 feet distant. The wall is dotted (high and low) with white powdery marks, and the floor at the foot of it is covered with broken and powdered plaster, as also is (more or less) the space of intervening floor. The splits in the upright unite upwards, and pass through the loft floor at a comparatively small orifice, and the piece rent out tapers considerably from the bottom upwards. The rent surface of this piece is minutely *fretted* in a curious manner. In the bottom of the rent off piece (which comprised the greater part of the sectional area of the post at this end) were three or four $2\frac{1}{2}$ -inch iron nails, probably used for fixing the post to the floor. These appeared to be driven and bent into the wood; there was no sign of fusing on them, and the surface of the floor immediately underneath the bottom of the post was not in the slightest degree damaged, so far as could be detected. On each side of the slight brickwork forming the east wall of the dormer or porch, a small patch of plaster (about 6 inches square or so) was broken off close to the floor, and about 3 feet southward of the post, but no other marks attributable to the explosion (and these small patches might have been due only to the concussion) could be discovered at the second floor.

On entering the room below (on the first floor), which has no ceiling, it was found that the wooden girder ($9\frac{1}{2} \times 4\frac{1}{2}$), on which the post rested, had a splinter 16 inches long and about 1 inch square (on an average) torn horizontally off the east side of it, 3 or 4 feet to the southward of the position of the bottom of the post, and about 6 feet from the south wall. The girder extends across the room, and rests on the north and south walls. Below the splinter, on the same girder, there was a horizontal crack, extending through the breadth of the girder, and proceeding about 8 feet along it northward, but stopping short of the position of the post above. It seemed, however, *possible* that there might be yet another horizontal split in this girder *close* to the under side of the floor above, and extending right up to the position of the post. Along the west side of the girder is a short joist (7 inches by 3 inches) passing through the south wall, extending about 4 feet into the room, and fixed to the girder by three large iron trenails; and just below it there was some more slight woodwork bedded in the wall, and apparently rotten. This joist was forced out from the other about 1 inch, and had a horizontal split passing exactly along the line of the heads of the three trenails, and completely separating it into two layers. A small piece of the rotten wood underneath (about 6 inches by 2 inches by $\frac{1}{2}$ inch) was broken off, and thrown about 4 feet into the room on the floor to the north. An irregular patch of damp plaster about 4 feet by 18 inches, which had formerly concealed this rotten woodwork, was torn off, and most of it was (as in the room above) thrown hard against the opposite north wall, to which portions were still adhering. These portions are chiefly high up the wall, and near the floor above. Some larger pieces were also spread over the intervening space. The wall where this plaster was torn off was almost saturated with moisture, and the plaster round the rent piece was quite wet and discoloured.

There are no certain traces of the thunderbolt visible on the outside of the south wall, where, however, it most assuredly must have been present. The ground at the foot showed no signs of rending. There was a small lean-to outhouse nearly below, the roof of which was damaged; but I was led to understand that this had been done before; and as the place was locked, and my time was limited, I did not go in side it. At the angle made by one of the side walls of this outhouse with the main building, and not far from a point vertically below the position of the end of the girder, was a wet piece of ground habitually used for emptying slops at; and this seemed by no means an unlikely place for the thunderbolt to have originated. Here and there on the face of the dilapidated masonry some rather new looking abrasions were to be seen; but not even just abreast of the end of the girder could I detect for certain any

traces of the explosion; and no metal of any kind was visible. In this connection it may be mentioned that there were no eaves-gutters, rain-water pipes, or metals of any sort on the outside of the house or on the roof.

Perhaps the most noteworthy feature of this accident was the *complete absence of any sign of burning or charring* at the rents in the girder, joist, post, and rafter. The nails struck also showed no symptoms of fusing; and, for all the *traces* that were left by the stroke, it might have been quite unaccompanied by heat. The work of the explosion seems to have taken altogether the form of mechanical violence. The wood of the post, rafter, and girder is sound, dry, old fir, and this would seem peculiarly liable to be set on fire.

The almost perpendicular bend that the course of the stroke seems to have taken from the girder to the post is also very curious. That the direction and force of the stroke was *upward* appears to me a conclusion quite irresistible. I have but little doubt in my own mind, from the traces left by the thunderbolt, that it sprang from the ground outside the building, at or near the wet south wall; passed up its outer face, entered the building through the wall at the rotten wood, and passed through or close to the joist and girder; then, attracted by the nails in the bottom of the post, it took a sudden turn upward (for there were no other marks of its course in the first floor room than those described), cleft right through the heart of the post, altered its course obliquely to gouge out the lower part of the rafter as far as the small nail, broke through the tiles, knocked off the chimney-top, and thence rushed to join the complementary force that had already started from the thundercloud to meet it.

A. PARNELL

13, Windsor Terrace, Newcastle-on-Tyne, June 14

The Soaring of Birds

IN NATURE, vol. xxvii, p. 535, Lord Rayleigh gives what he suggests as a possible explanation of the soaring of "pelicans and other large birds in Assam" mentioned by Mr. S. E. Peal. My own observations correspond so exactly with the theory advanced that I venture to give them for whatever they may be worth.

I have never indeed observed the flight of pelicans, but the Indian kite, the turkey buzzard, and perhaps all vultures, have the same habit of soaring in great circles. The *sandhill crane*, as it is commonly called in the United States, a large migratory crane, possesses this characteristic in a most remarkable degree. These birds will go soaring about for hours at an immense height, never seeming to move a pinion except once in a great while to steady themselves a little. They always move in irregular circles at such times, and there is always a drifting with the wind; but at such a great distance above one it would be impossible by mere ordinary observation to detect the obliquity of the circles if it existed.

A short time since, however, I had a fine opportunity of witnessing the soaring of some kites; the advantageous circumstances being that they were not far away, and that I saw them commence when they were so low that there was little chance of being mistaken in what I saw. I was sitting before an open window one day about eleven o'clock. There was a gentle breeze blowing from the south-east at the time. Pre-entirely my attention was attracted by several kites over the village to the north-west. The motions of two in particular I followed for some time. After moving their wings to attain an elevation above the houses and trees they began soaring, and continued upward in this manner to a height of perhaps two thousand feet, apparently making no exertion with their wings except to steady themselves a little occasionally. The method of accomplishing this was evidently to circle away to leeward in a great curve which inclined downward a little, thus acquiring considerable momentum; then turning toward the wind and adjusting the surfaces of the wings to the proper angle, they would shoot upward to a point considerably higher than the one from which the circle began. By the time the momentum was exhausted the bird was circling around again for another sweep to leeward.

There was considerable drifting with the wind, so that in attaining an elevation of some two or three thousand feet the birds had moved away nearly a quarter of a mile. Their consequent upward motion was in an irregular spiral, the highest parts of the curves being on the windward side.

Ongole, India, May 21

W. R. MANLEY